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Clinical Lecture
ON
INTRATRACHEAL ANÆSTHESIA.*

BY STANLEY ROWBOTHAM, M.R.C.S. ENG.,
ANÆSTHETIST TO THE CANCER HOSPITAL.

INTRATRACHEAL anæsthesia is a method of administering an anæsthetic agent by delivering it directly into the patient's trachea through a tube. In so doing the first part of the respiratory tract as far as the vocal cords is cut out. I have made this definition a wide one, because, although intratracheal anæsthesia as it is generally understood consists of a simple insufflation of anæsthetic into the trachea, I want later on to describe to you certain methods of laryngeal intubation, which while they certainly cut out the first part of the respiratory tract, do not altogether coincide with the general description of intratracheal anæsthesia which you will find in text-books.

HISTORICAL.

Intratracheal anæsthesia was first introduced by two American physiologists—Meltzer and Auer—in 1909. They used the method to anæsthetise animals, and published an account of their experiments.[1]

The chief points of their report were: (1) The proper exchange of air in the lungs can be accomplished by blowing air in a continuous current through a tube passed nearly to the bifurcation of the trachea. (2) The normal respiratory movements may be abolished by opening both pleural cavities, and the animal still kept alive and its blood oxygenated by this method.

In 1910 Elsberg, an American surgeon, first used intratracheal anæsthesia in human beings: and it was introduced into this country by Kelly,[2] who published a description of the method. Up to the war I do not think the method had become very popular in this country; but during the later years of the war it began to be largely used for chest, jaw and face cases.

To-day intratracheal anæsthesia has established itself as one of the most valuable methods of administering an anæsthetic we have for certain cases; and the number of different apparatus on the market, each one more complicated and fearsome than its predecessor, is sure testimony of its growing popularity; by some it is used even for abdominal operations, although it is difficult to see of what practical use it can be for this type of work.

METHOD OF INSUFFLATION.—APPARATUS.—TECHNIQUE.

In the original method described by Meltzer and Auer, a catheter is passed through the glottis almost as far as the bifurcation of the trachea, and the return current of air escapes between the catheter and the walls of the trachea. Air carrying a certain percentage of anæsthetic vapour, or a combination of gas, oxygen and ether, is blown under a small positive pressure through the catheter. This enables a diffusion of gases to be carried on in the lung, just as in ordinary inhalation anæsthesia, but independently of respiratory movements, or freedom of airway, although (except when the pleural cavity is opened) spontaneous respiration continues.

Apparatus.

The essential parts of an apparatus for administering an intratracheal anæsthetic are as follows:—

1. Mechanism for producing an air current, this may be (*a*) electric motor or foot bellows; (*b*) cylinder of compressed oxygen; (*c*) cylinders of nitrous oxide gas and oxygen; (*d*) cylinder of compressed air.

2. An arrangement whereby varying amounts of ether (or in some cases chloroform) may be added to the air current.

3. A device for warming the vapour. This is necessary, because the patient's natural mechanism for warming his inspired air is out of action.

4. A safety valve. It is very important that the pressure of air delivered to the lung should not exceed 20–30 mm. Hg. If this is exceeded damage is likely to be caused to the delicate alveoli. The safety valve is best set to blow off at 15–20 mm. Hg.

5. A catheter (which is connected by rubber tube to the apparatus). It is essential to use a catheter of adequate rigidity which can be sterilised, size 18–24 (F.C.G.) according to age, size of patient, &c. For an average adult size 22 is most generally employed, but it is better to use a catheter which is on the small side, rather than one which is too large, or the return stream is likely to be obstructed.

Introduction of the Catheter.

Anæsthesia is induced in the ordinary way. The patient must be deep enough to obtain thorough relaxation of the jaw and the abolition of the laryngeal reflex.

Sitting at the patient's head, with the head in the normal position, neither flexed nor extended, and with no pillow, a direct-vision laryngoscope (with internal light or pencil light pushed down by its side) is passed through the mouth and into the pharynx. A view is first obtained of the epiglottis, which is then hooked up by the laryngoscope. This first exposes the cartilages of Santorini and the arytenoids.

Very little elevation of the end of the laryngoscope will now bring into view the aperture of the larynx. In doing this care must be taken not to lever on the patient's teeth, or they may be broken. If it is necessary to use force, the laryngoscope should be slipped to the side, and a pad of gauze interposed between it and the molar teeth.

The catheter (with a stiff wire stylet to keep it from bending and to enable one to control it) is now passed either down the laryngoscope or by its side, and through the rima glottidis. The stylet is removed, the catheter connected with the anæsthetic supply by a rubber tube and held in position by adhesive plaster. In an average adult the catheter should be passed a distance of about 25 cm. from the incisor teeth, or just short of the bifurcation of the trachea. A sufficient volume of air (or gas and oxygen) should be supplied to the patient to provide for the whole of his inspiration (unless a return airway be provided—this I shall speak of later). The depth of anæsthesia is judged by the usual signs, although the respiratory sounds are somewhat altered—expiration only being audible.

After operation, before removing the catheter, the mouth and pharynx should be thoroughly cleansed of all mucus and blood. If there is still danger of hæmorrhage, the catheter should be kept in, and an air stream maintained until the patient's cough reflex returns.

This is the technique of ordinary text-book intratracheal anæsthesia, but I want now to describe one or two additions or refinements which I have found of help in producing a more tranquil anæsthesia, and which give the surgeon a better chance to operate unhampered in the region of the respiratory passages.

Double Intubation.

It will be easily understood that when a catheter is passed into the trachea and air is blown down it the return stream issuing between the catheter and the walls of the trachea, and so into the mouth, will bubble through any blood there may be into the throat, mouth, or nose. This is a serious obstacle to a surgeon operating in these regions. Moreover, the jaw being unsupported, the tongue will fall back and offer a considerable resistance to the return stream. The entering air, therefore, must be blown through the catheter at a moderately high pressure (much higher than that found in the trachea and bronchi

* Based on a lecture delivered at the Cancer Hospital.
[1] Journal of Experimental Medicine, 1909, xi., 622.
[2] Brit. Med. Jour., 1912, ii., 112.

during normal respiration) in order to overcome this resistance.

I do not know whether prolonged subjection to this positive pressure is capable of doing the delicate lung alveoli harm; but it is a fact that if this resistance to the return stream be removed the anæsthesia is very much quieter and more peaceful. In order to overcome it I have resorted to the practice of double intubation—that is to say, side by side with the catheter a second and larger tube is passed by way of which the return stream will travel. This is made of a special thin-walled, hard rubber which does not easily collapse, and is tied to the catheter and passed into the trachea with it. Its advantages in producing quiet breathing, freedom of airway, however much the jaw be depressed, and in preventing bubbling of blood which often obscures the surgeon's view when only a single catheter is used, are so considerable that I am sure one is justified in using it in nearly every case. In intranasal operations, for instance, the use of a post-nasal sponge becomes quite unnecessary.

OPERATIONS ON THE MOUTH, TONGUE, AND THROAT.

When the mouth is the site of operation, the nose is chosen as the route for delivering the anæsthetic—the catheter being passed down one side and the return airway down the other. As a preliminary measure and before starting the anæsthetic, in order to prevent bleeding which may obscure one's view with the laryngoscope, it is advisable to spray the nose with adrenalin, or a mixture of cocaine and adrenalin. The catheter and the return tube should be well lubricated with sterile vaseline to facilitate their passage through the nose.

As originally described by me,[3] this method consists in passing the catheter through the nose, and then, by the aid of a direct laryngoscope and a special guiding rod, catching it up in the pharynx and directing it into the trachea; but with practice I have found that the catheter can nearly always be manipulated through the cords quite easily if it is stiffened by a wire stylet, and bent to form about half a circle. With stylet in place it is passed down the nose and then, by direct vision, guided into the trachea. It does occasionally happen, however, that a deviate septum or an incorrect curve on the stylet will necessitate the use of the guiding rod, by means of which one can pick up the catheter at its eye and guide it between the cords. The return tube has a stouter stylet which runs through a hole in the metal angle-piece at the top of the tube, and it can be moved from side to side in the pharynx by rotating the stylet which obtains some purchase on the metal angle-piece.

I had a special guiding rod made to pick up this tube as one does the catheter,[4] and although generally the stylet is sufficient, on occasions it proves very useful. In this way the air passages are shut off from the mouth, which can be full of blood without danger of any entering the trachea. There are three sizes of return tube, which are chosen according to the size of the patient.

It is in these operations about the mouth and throat (big dental extractions, tonsil dissections, excision of tongue, &c.) that double intubation is especially useful, for not only is the anæsthesia tranquil, and the airway maintained, however much the jaw be depressed, but the surgeon's work is not hampered by the constant need for swabbing away blood which has bubbled up from the mouth.

Single Intubation.

In the majority of cases I suppose an intratracheal anæsthetic is given, because by its use the airway can be controlled without holding up the jaw or otherwise handling the patient's head, and the anæsthetist can keep well out of the surgeon's way. It is only in very few cases that a positive pressure is really necessary.

It occurred to me that if one could pass a single tube of adequate size through the mouth (or nose) and into the trachea, and allow the patient to breathe backwards and forwards through it, a state of things much more akin to that which occurs during natural respiration would be achieved. Moreover, the first part of the respiratory passages would be just as well cut out; and, provided the tube were sufficiently large to fill the glottic opening, there would be no danger of blood or other material entering the trachea. This was found to be no more difficult than passing the smaller return airway for use with a catheter; in fact, the single operation takes less time. A special stylet was made for controlling the tube when passing it through the mouth.

This single intubation has the added advantages that a rebreathing bag may be attached, and gas and oxygen given in the ordinary way—this gives a much more satisfactory anæsthesia, and also (when necessary for such cases as diathermy) chloroform from a Junker's bottle may be very easily administered through it.

CHEST CASES.

In operations where the pleural cavity is to be opened it is a great advantage to be able to control the collapse of the lung, and where necessary to keep it blown up This can be easily done by double intubation combined with some method of checking the return stream. For this purpose a simple apparatus provided with a shutter and pressure gauge is connected with the return tube.

We found first of all from our experiments on dogs, and later on when administering anæsthetics to human beings, that the symptoms of collapse from which patients suffer when a pneumothorax is first produced can be very largely prevented by maintaining a positive pressure in the lung of 15–20 mm. Hg, and only reducing it very slowly should the surgeon require the lung to be collapsed.

SUMMARY.

(1) Intratracheal anæsthesia is the method of choice for all operations upon the head, nose, mouth or throat, where the anæsthetist cannot maintain a satisfactory anæsthesia and a free airway by the ordinary methods without seriously interfering with the surgeon.

(2) When there is blood in the upper air passages it is a necessity—effectively preventing its entrance into the bronchi and air cells, and lessening the liability to pulmonary complications. In double or single intubation we have a refinement which is of great help to the operator in shutting off the air passages and giving him a clear field for operating.

(3) In intrathoracic operations where normal respiratory mechanism is interfered with, double intubation enables one not only to maintain respiratory exchange, but to regulate the collapse of the lung, and so save the patient much shock.

[3] Brit. Med. Jour., 1920, ii., 590.
[4] Brit. Med. Jour., June 30th, 1923.

ADVISORY COUNCIL FOR SCIENTIFIC AND INDUSTRIAL RESEARCH.—Prof. Vernon Herbert Blackman, Sc.D., F.R.S., Prof. Frederick George Donnan, C.B.E., D.Sc., LL.D., F.R.S., and Prof. Frederick Alexander Lindemann, Ph.D., F.R.S., have been appointed by Order of Council, dated August 20th, to be members of the Advisory Council to the Committee of the Privy Council for Scientific and Industrial Research, in the place of members who have retired on the completion of their terms of office.

Mr. Henry Kimpton announces the forthcoming appearance of a book on the "Surgical Treatment of Goiter," by Dr. Willard Bartlett, with a foreword by Dr. Charles Mayo; a fifth edition of Hajek's "Pathology and Treatment of the Inflammatory Diseases of the Nasal Accessory Sinuses," translated and edited by Dr. Joseph D. Heitger and Dr. French K. Hansel; and a manual of "Clinical Laboratory Procedure," for the use of the general practitioner, by Dr. Robert A. Kilduffe, city bacteriologist, Atlantic City.

Cameron Prize Lectures

ON

SOME RESULTS OF STUDIES IN THE PHYSIOLOGY OF POSTURE.

Delivered at the University of Edinburgh, May 19th and 20th, 1926,

BY RUDOLPH MAGNUS,

PROFESSOR OF PHARMACOLOGY, UNIVERSITY OF UTRECHT.

PART II.*

B. GENERAL STATIC REACTIONS OF THE MID-BRAIN ANIMAL.

After cross-section through the calamus scriptorius the animal behaves like a spinal preparation without static functions (only the tonic neck reflexes are present); if under the influence of one or other stimulus the muscles get some "background-tonus," the change of such tone after turning of the neck can be demonstrated. After a cut just in front of the entrance of the eighth nerves, the animal shows decerebrate rigidity and has active tonic neck and labyrinthine reflexes. The centres which give rise to the rigidity and the labyrinthine reflexes are situated in the caudal part of the medulla oblongata. They are, including their afferent and efferent paths, extracerebellar.

This picture remains in the main unchanged if the cutting of the brain-stem is performed more orally. Then also reflexes on the abducens and trochlearis nerves and neck righting reflexes appear, but the general condition remains the same. The latter does not change fundamentally, until the cut is made through the most oral part of the mid-brain: in rabbits and cats through the foremost half of the anterior colliculi and in front of the origin of the oculomotor nerves. The condition of the animal is then no longer "decerebrate" but becomes "normal." The difference is caused by the absence of rigidity, the appearance of a normal distribution of tone, and the presence of the righting function. That means that the animal is able from all abnormal positions by its own active movements to right itself into the normal position and to keep this position against all disturbing influences.

If the cuts are made more orally, no *essential* differences in the static behaviour can be observed. It makes no appreciable difference in the static behaviour whether the basal ganglia are present or have been extirpated. If the fore-brain is left intact the influence of optic stimuli upon posture in some species of animal can be demonstrated. Extirpation of the cerebellum gives rise to very characteristic symptoms, but all the static reactions which are described in these lectures are present, and can still be evoked with great certainty. Some of these reactions seem to be exaggerated in the decerebellated animals.

The most convenient way to study all static reactions of the mid-brain animal is to prepare a thalamus preparation. Then the heat regulation is undisturbed, the function of the mid-brain centres is not greatly interfered with by operative shock, and in consequence of the absence of the fore-brain no voluntary movements disturb the observation. It is clear, however, that control experiments on mid-brain animals should always be made. For this purpose the rabbit, which is very resistant to shock, should be chosen.

1. *The Normal Distribution of Tone.*

The distribution of muscle tone in the whole body musculature in the mid-brain and thalamus animal differs from that in the decerebrate preparation by the absence of the exaggerated enduring contracture of the static muscles. These have only just sufficient tone to carry the weight of the body and to balance it. The result is the "normal" attitude and posture of the thalamus, as compared with the "caricature" attitude of the decerebrate preparation.

In the former even slight muscular actions are sufficient to change the position of the body.

While in the decerebrate preparation the flexor muscles are completely deprived of tone, they are in the mid-brain animal just as much under tonic innervation as they are in the normal animal. In consequence of this the flexor muscles participate much more in all sorts of reflexes than they do in decerebrate rigidity. Reflex inhibitions of flexor muscles can, on the basis of their "background" contraction, easily be demonstrated. The experiments of Girndt have shown how the reflex behaviour of a thalamus animal is influenced by the presence of flexor reflexes.

The attitudinal reactions of the thalamus and mid-brain animal differ also from those of the decerebrate preparation by the presence of flexor responses. Changes in the position of the head, under decerebrate rigidity, give rise to reactions chiefly in the extensor muscles, whereas in the mid-brain and thalamus animal flexors and extensors are influenced simultaneously. The change of tone in the flexors and extensors follows the laws of reciprocal innervation, increased extensor tone being accompanied by flexor inhibition and vice versa. This makes the static reactions more smooth and exact.

After ordinary reflex excitations the extensor muscles do not show the prolonged after-effect of the decerebrate preparation, and this also prevents the appearance of stiff movements. The decerebrate preparation shows no positive supporting reflex and only a very imperfect negative phase. The whole supporting reaction, which changes the limb from the movable and instrumental condition into a static support and vice versa, is only fully developed in the mid-brain or thalamus animal.

All these observations show the fundamental part the mid-brain centres play in the whole static function. It is to be expected that the study of the thalamus animal will disclose many interesting facts, and that, just as the last 20 years have with such great success been devoted to the study of the decerebrate preparation of Sherrington, in the next period the mid-brain animal must be the chief object for further careful analysis.

2. *The Righting Reflexes.*

Analysis has shown that the righting function is carried out by the coöperation of five groups of different reflexes. It is, therefore, intelligible how it should be impossible to study the action of one of these groups by paralysing the sensory nerve-organs, from which this group of reflexes takes its origin. The result of such a procedure would only be that the four other groups of reflexes would compensate for the loss of function so produced, and that probably no disturbance of righting would result. Here, as in other complex functions of the central nervous system, it is not permissible to draw conclusions from the isolated paralysis of one set of reflex centres. A complete understanding of the whole mechanism is only possible if the experiment starts from the "zero condition" in which *all* centres or mechanisms concerned in this complex function have been paralysed, so that it is completely absent in the animal. Then in subsequent experiments one or another centre of sense organ may be spared and the function arising under this new condition compared with the "zero condition." It is thus possible to study every single reflex while excluding all others and, finally, to analyse the coöperation of these several reflexes towards a general function.

(*a*) *The "Zero Condition."*

In the case of the righting reflexes the zero condition is fulfilled if a thalamus or mid-brain animal after extirpation of both labyrinths is held freely in the

* Part I. appeared in THE LANCET last week.

air without touching the ground. Then no attempt will be made by active movements to bring the head or the body into the normal position. If the animal is held by the pelvis in the lateral or supine position the whole body, including the head, remains also in this position. The "zero condition" of animals with *intact* cerebrum differs according to species. Rabbits and guinea-pigs, in which the eyes are not used for righting purposes, if delabyrinthised and held freely in the air, show no righting reflexes. Cats, dogs, and monkeys, on the other hand, must be also blindfolded.

Under all these conditions the animal is completely disorientated and cannot bring its head or body into the normal position.

(*b*) *Labyrinthine Righting Reflexes.*

If their labyrinths are intact then all thalamus animals as well as normal rabbits and guinea-pigs and blindfolded normal dogs, cats, and monkeys, when investigated freely in the air, show the following reflexes:—

If the animal is held by the pelvis in the normal position the head also assumes the normal position. If the pelvis is held in the lateral position the head is by rotation brought into the normal position. It is possible to turn the pelvis from one lateral position into the other, while the head remains in the normal position. In whatever position the pelvis be supported—e.g., supine or vertical with the head above or below—the head itself is always held in the normal position.

These reflexes act primarily on the neck muscles. They are originated in the labyrinths and disappear after labyrinth extirpation. They also disappear after detaching the otoliths by centrifuging. For the discussion as to which otolithic maculæ are responsible for the labyrinthine righting reflexes we must divide these reflexes into two groups:

1. The *asymmetrical righting reflexes* bring the head from asymmetrical—e.g., lateral—positions into symmetrical positions about a vertical plane.

2. The *symmetrical righting reflexes* provide that out of all possible symmetrical positions the normal position is taken.

The asymmetrical righting reflexes are evoked from the maculæ sacculi. This is proved by the fact that after unilateral labyrinth extirpation the resting position of the head is no longer the normal position, but the lateral position; from which it must be concluded that the maculæ concerned cannot lie in one plane, so that the utricular maculæ cannot be responsible for these reflexes. The asymmetrical righting reflex after unilateral labyrinth extirpation is very strong, if the head is kept in the lateral position with the intact labyrinth below; then the saccular otolith pulls on the macula. The head comes to rest and the reflex therefore reaches its minimum, if the intact saccular macula lies horizontal with the otolith pressing upon it. In this case therefore it can be proved that the maximum of stimulation in the macular epithelium must be evoked by the pulling, and the minimum stimulation by the pressing otolith. The utricular maculæ are probably the point of origin of the symmetrical righting reflexes. This has been concluded from experiments, in which the labyrinths of guinea-pigs have been paralysed step by step with cocaine, so that first the saccular and then the utricular reflexes disappeared, while the reflexes from the canals preserved their function for some time longer.

In every case the symmetrical righting reflexes bring the head into such a position that the utricular maculæ lie horizontally, so that the otoliths press upon the sensory epithelium. This reflex then reaches its minimum and the head comes to rest.

The labyrinthine righting reflexes provide for orientation of the head in relation to space, gravity being the controlling influence.

(*c*) *Body Righting Reflexes Acting upon the Head.*

For an isolated demonstration of these reflexes we start again from the "zero condition," and hold a labyrinthless thalamus or intact animal (blindfolded or not according to the species) freely in the lateral position in the air. Then the head also will be in the lateral position. We now place the animal upon the table, and notice that immediately after the body of the animal comes into contact with the ground the head is rotated towards the normal position. This reflex is evoked by the asymmetric stimulation of the pressure sense organs on the body surface. This can be proved by compensating for the asymmetry of stimulation—e.g., by placing a weighted board upon the upper side of the animal, so that the pressure upon each side of the animal is the same. The head then falls back into the lateral position. If the board is taken away the head is again righted. If the animal then be lifted from the ground, the head returns to the lateral position. These observations show the importance of tactile stimuli for the orientation of the head. By these influences the head is orientated in relation to the ground or other surfaces with which the body of the animal comes into contact. Reflexes of this sort can be evoked not only from the surface of the trunk, but also from the soles or palms. In this way the heads of climbing animals, such as monkeys, squirrels, &c., are orientated towards the objects upon which the animal is climbing.

These reflexes also play a rôle in the correction of abnormal positions of the head. After unilateral labyrinthectomy the rotation of the head towards the operated side, which is often very distinct, becomes greatly diminished if the animal be placed on the ground.

In this way two active influences coöperate in righting the head: the one in relation to gravity, the other in relation to the ground.

(*d*) *Neck Righting Reflexes.*

The neck righting reflexes orientate the body in relation to the head. When, by the combined action of the labyrinthine and body righting reflexes, the head is restored to the normal position, while the trunk still remains in the original abnormal position (e.g., the lateral), then the neck is twisted. This evokes a reflex by which the thorax is brought into symmetry with the head. This may give rise to a rotation of the lumbar region, which in turn causes a similar reflex upon the hind part of the body, so that finally the whole body has followed the head into the normal sitting position. In a similar way dorsiflexion of the head gives rise to lordosis of the whole vertebral column. Ventroflexion is followed by a curving of the whole body in the ventral direction. Inclination of the head towards one shoulder evokes curving of the vertebral column with the concavity to this side.

All these influences can be immediately seen if an intact animal be held freely in the air with the pelvis in all different positions. The head is then primarily brought into the normal position, and the fore-part of the body follows the head, whereas the pelvis is prevented from doing so by the hand supporting it. Several of these reflexes can easily be demonstrated in the supine position of the animal; movements of the head in different directions evoke in this position very marked reactions upon the hind part of the body. The neck righting reflexes make it possible, by simple movements of the head, to bring the body of even very strong animals on its side.

(*e*) *Body Righting Reflexes Acting upon the Body.*

The neck righting reflexes ensure the orientation of the body in relation to the head; the body righting reflexes right the body in relation to the ground (or any surface with which the body comes into contact—e.g., in climbing). These reflexes make it possible for the body to be righted, even if the head is not in the normal position.

The easiest way to demonstrate these reflexes is to hold a normal animal in the lateral position in the air, the head also being kept firmly in the lateral position. In this condition the neck righting reflexes tend to keep the body in the lateral position. If now the animal is placed upon the table and the head kept continuously fixed in the lateral position, the body is seen to be righted into the normal position in spite of the tendency of the neck righting reflexes to keep the body on its side. The active stimuli for these reflexes arise in the sensory nerve-endings of the body surface, which are stimulated asymmetrically by the pressure against the ground. If by means of a weighted board the other side of the body is also pressed upon, the symmetry of stimulation is restored and the body therefore remains in the lateral position.

In climbing animals similar strong influences arise from the feet and hands, and cause orientation of the body towards trees, walls, roofs, &c.

(*f*) *Optical Righting Reflexes.*

The four groups of above-described reflexes are the only righting reflexes of the thalamus animal, and also of intact rabbits and guinea-pigs. In higher mammals such as cats, dogs, or monkeys with intact cerebrum the eyes contribute towards the orientation of the head. In order to study these reflexes the delabyrinthised animals must be examined freely in the air. Then it can be seen that the head, if blindfolded, is completely disorientated and shows no correction from any abnormal position. If the eyes are opened, the head is brought into the normal position as soon as the visual attention of the animal is attracted, and it fixes with its eyes something in its environment, such as food, a fly, the assistant, &c. If this visual attention ceases, the head may go back into any abnormal position.

The exact position of the centres for these reflexes has not yet been determined. It may be supposed that they are localised in the optical cortex.

All these reflexes coöperate in the intact animal, and enable the body to attain and to keep a certain position. If the animal is moving on the ground all these reflexes coöperate in the same sense, but if the animal is climbing a vertical surface or beneath a horizontal roof—i.e., of a cage—sometimes conflicting influences come into play and lead to interesting results.

The integrity of every single factor of this complicated function is doubly ensured. The head is righted by labyrinthine, tactile, and optical stimuli; the body by proprioceptive and tactile stimuli. The tactile stimuli act separately upon the body and upon the head. The orientation of the head and of the body takes place in relation to gravity, sustaining surface (ground, &c.), distant environment (optical), and to parts of the body—a very complex combination of reflexes. It is indeed an interesting task to watch the coöperation and interference of these reflexes during the movements of various animals in their ordinary life.

3. *The Centres for the Righting Reflexes.*

The position and distribution of the centres for the righting reflexes have been determined by Rademaker. In a great number of experiments with cats and rabbits he made transverse sections through the brain-stem at different levels, determined those reflexes which were present after recovery from the shock of the operation and those which were absent, and made in every case a careful histological examination of a complete series of microscopical sections. A synopsis of all experiments showed the most caudal level for each reflex at which a transverse section of the brain-stem did not interfere with its function. The conclusion could then be drawn that the centres of that special reflex must, together with the afferent and efferent paths, be situated caudally from this level. Then cutting across somewhere behind this level led to the disappearance of the reflex. In this case the conclusion that the centre must be situated orally to this level cannot be drawn with absolute certainty, because it is always possible that the centre lies behind the cut, but is thrown out of action by shock or diaschisis. In this way it was found by Rademaker that section through the anterior part of the anterior colliculi and just orally from the points of origin of the third nerves does not interfere with the presence of normal labyrinthine and body righting reflexes, whereas a section carried out some millimetres more caudally—i.e., behind the origin of the third nerves—destroys the above-mentioned righting reflexes. In the latter case the neck righting reflexes are still present. Their centres are arranged more caudally in the pontine region. Extirpation of the dorsal half of the mid-brain does not interfere with the presence of the righting reflexes. Total extirpation of the cerebellum leaves all righting reflexes, including the body righting reflexes, intact. By these experiments it is proved that the centres for the righting reflexes lie in the ventral part of the mid-brain behind a section just in front of the third nerves. The disappearance of the labyrinthine and body righting reflexes after cutting the mid-brain behind the third nerves suggested the possibility that the centres for these reflexes were situated just at the level of the oculomotor nerves. The most remarkable nucleus here is the red nucleus, the magno-cellular part of which gives origin to the rubro-spinal tract, which crosses at about the same level in the decussation of Forel. As median sagittal splitting of the mid-brain destroys the righting reflexes in question, the probability is increased that the red nuclei are the centres sought for. Therefore Rademaker proceeded to make dorsal or ventral median incisions into the mid-brain, which divided it just deeply enough to leave Forel's decussation undisturbed. Animals with such incisions showed the righting reflexes. But as soon as the cut was made a little deeper, so that the rubro-spinal tracts were severed, the labyrinthine and the body righting reflexes acting upon the body disappeared. Other experiments of Rademaker showed that the righting reflexes were normally present after the destruction on both sides of the substantia nigra and the pyramidal tract. Also lesions lateral to the red nuclei did not prevent the appearance of the righting reflexes. By all these experiments it is proved that in the cat and rabbit the red nuclei are the centres for the labyrinthine righting reflexes and the body righting reflexes which act upon the body. The efferent path for these reflexes is the rubro-spinal tract. The body righting reflexes acting upon the head have their centres at the same level, but not in the red nuclei. The centres for the optical righting reflexes are cortical, the centres for the neck righting reflexes lie more caudally in the pontine or upper bulbar region. The exact course of the afferent paths for all these reflexes is still to be determined. It is only known that they do not pass through the cerebellum.

In the thalamus animal extirpation of the red nuclei or isolated severance of the rubro-spinal tracts causes still another change. It leads to the disappearance of the normal distribution of tone and the appearance of decerebrate rigidity. The presence in the thalamus animal of rubro-spinal impulses counterbalances the influences from the centres in the lower bulbar region, which, if acting alone, cause the extensor tone to be greatly increased with diminution of flexor tone.

The following experiment of Rademaker's was very striking. In a thalamus animal a thread was drawn through the medial plane of the mesencephalon in the dorso-ventral direction just behind Forel's decussation. The animal showed normal distribution of tone, all righting reflexes, and normal sitting and running. Then slight traction was applied to the thread just sufficient to divide the rubro-spinal decussation. The result was maximal decerebrate rigidity, paralysis of the labyrinthine righting reflexes, and the body righting reflexes acting upon the body.

While in the thalamus animal cutting of the rubro-spinal tract causes such marked effect, in the normal animal with intact fore-brain the same operation has much less drastic consequences. The extensor tone

is, however, increased, but much less so than in the thalamus preparation. Only if, in addition to the rubro-spinal bundles, the pyramidal tracts are also severed, does there follow a marked increase of extensor tone. The pyramidal tract has the function of partly counterbalancing the influence exerted in the spinal cord by the hind bulbar centres, which tend to increase the extensor tone. We see thus that the tone and excitability of the spinal centres is governed by influences arising in the brain, a part of these tending to shift the mechanism in the direction of increased extensor tone, another part counterbalancing this influence with the result that both groups of muscles get equally their right share.

4. *Righting Reflexes in Man.*

The study of righting reflexes in man is still in its infancy. We know that these reflexes are present here also, but a careful analysis along the lines shown by animal experimentation has not yet been carried out, and not much is known about the way in which they coöperate towards providing the erect posture. Landau, Schaltenbrand and others have begun the study in children during their first developmental stages, in which they acquire the erect posture and learn how to stand and to walk. Only when this pioneer work has been accomplished will an understanding of pathological conditions be possible.

Labyrinthine righting reflexes can be demonstrated in children who are blindfolded and held by the pelvis in different positions in the air. The head can then be seen to be moved towards the normal position (Schaltenbrand).

Neck righting reflexes are very active in man. In children they have been studied by Landau, who showed that babies in the prone position usually bring the head by dorsiflexion into the normal position, and this is followed by strong lordosis of the vertebral column with extension of the limbs. Passive ventroflexion of the head causes disappearance of the lordosis so that the whole body becomes ventrally concave. Schaltenbrand published photographs of babies in which rotation of the head causes the body to roll from the supine into the lateral position, a reflex which, according to Zingerle, can be demonstrated in many patients. Text-book photographs of gymnasts give ample evidence of the presence of similar neck righting reflexes in normal adults.

Our own experience teaches that the optical righting reflexes in man play a very important rôle. Of this many examples could be given. It is sufficient to remember that in aviation the exclusion of visual impressions when the aeroplane is passing through mist or clouds makes orientation practically impossible. Often when the aviator emerges from the clouds and can once more see the ground, he finds that he has been completely disorientated with respect to the earth.

The "zero condition," in which all righting reflexes are suppressed, is realised if labyrinthless deaf-mutes are submerged under water. Then no body righting reflexes can be evoked, optical orientation is absent, and the labyrinths are functionless. As a consequence of this such patients will be drowned if no care is taken to help them out of the water.

Experiments of Garten and his pupils on an inclining chair clearly demonstrated the great influence of the body righting reflexes evoked by the contact with the surface of the seat. Even when labyrinthine impulses were made as ineffective as possible and the eyes were closed, there was a very precise estimation of the smallest deviations from the horizontal plane. It is a pity that his early death prevented Garten from completing this research and from placing his experimental subjects under "zero conditions."

As to the relative influence of the different sensory organs for orientation it can be said that optical and tactile influences play a very important rôle in man, whereas the part played by the labyrinths is probably less than in rabbits and guinea-pigs. These observations tend to show that in the mammalian series the rôle of the labyrinths decreases.

FINAL REMARKS.

In concluding, I wish to draw your attention to the fact that the whole righting apparatus, with the only exception of the cortical centres for the optical righting reflexes, is arranged subcortically in the brain-stem, and in this way made independent of direct voluntary influences. The attitudinal as well as the righting reactions are involuntary. If under the influence of cortical impulses the normal position of the body be disturbed, the brain-stem apparatus is ready to restore it, so that every new cortical action finds the body in a normal starting position without previous voluntary effort.

By the action of the subcortical mechanisms described in these lectures the different sense organs are always brought into the normal relation with the external world. For the nerve-endings in the skin this is accomplished by the action of the above described attitudinal and righting reflexes. In the case of the eyes a very complicated reflex mechanism has been developed differing in various species of animals, which regulates the position of the eyes in relation to the environment. Here also labyrinthine and neck reflexes come into play. The result of all these arrangements is that the sense organs are righted in relation to the external world, so that every sensory impression, before being transferred to the cortex cerebri, has already acquired a certain special condition (local sign) depending on the previous righting functions acting upon the whole body or parts of it. In this way the action of involuntary brain-stem centres plays a very important part in conscious activities, especially as regards spatial sensations.

All these things have not yet been worked out in detail, and as these lectures are addressed to an audience of students I am glad to say: There is work enough left for you to do!

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BLOOD-SUGAR IN THE NORMAL AND DIABETIC.

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AT one time it was believed that the blood-sugar concentration remained at a practically constant level, even a large carbohydrate meal producing no increase in the amount of circulating sugar. Pavy was of the opinion that the liver prevented any rise in the blood-sugar concentration, and if for any reason the liver failed in its function and a hyperglycæmia resulted, the excess of sugar would be immediately excreted in the urine.

In 1911, however, Baudouin [1] found that there was a slight increase in the amount of blood-sugar one hour after a meal, an observation which was confirmed and slightly extended by Frank [2] and Reicher and Stein.[3] Two years later Jacobsen [4] showed that the rise in blood-sugar occurred much earlier than one hour after a meal, and, indeed, might be present within five minutes of a dose of sugar; a maximum concentration was usually reached in from 15 to 30 minutes after the dose of sugar, and in seven cases the blood-sugar had returned to its original level after 60 minutes. These observations have been confirmed by Bang, Graham, MacLean, and many others, and, during the last five years, the changes in blood-sugar concentration following the ingestion of a definite quantity of carbohydrate have been found of practical value in the diagnosis of early mild cases of diabetes and anomalous types of glycosuria.

The changes in blood-sugar concentration which occur in youth, old age, in diabetes and obesity after the ingestion of a fixed quantity of cane sugar are dealt with in the first part of this paper. In the second part the daily variations of the blood-sugar seen in normal and diabetic individuals on weighed diets are described and illustrated.

TEST BLOOD-SUGAR CURVES AFTER INGESTION OF CANE SUGAR.

(*a*) *Method.*

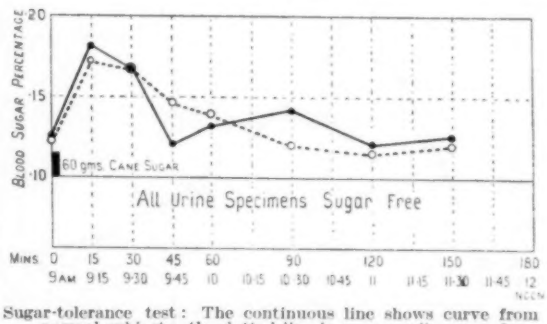
The blood-sugar curves were obtained in the following manner. After the subject of the experiment had fasted for about ten hours the bladder was emptied and the urine collected; at the same time 0·2 c.cm. of blood was taken for sugar estimation: 60 g. of cane sugar dissolved in 6 oz. of water flavoured with lemon-juice were given, and thereafter samples of blood were taken every 15 minutes for the first hour and at half-hourly intervals for a further two hours. The urine passed at the end of each hour was tested for sugar with Fehling's solution, and, if present, its quantity determined gravimetrically. The sugar in the blood samples was estimated by MacLean's method. When the results are graphically recorded the variations form a blood-sugar curve.

(*b*) *Curves in Health.*

Fig. 1 shows the effect of the ingestion of 60 g. of cane sugar on the blood-sugar concentration of a *healthy young adult*. From the resting level of 0·12 per cent. the blood-sugar rises rapidly to 0·18 per cent., this maximum being attained in 15 minutes after taking the sugar. The blood-sugar now begins to fall, and after 45 minutes is even lower than the fasting level. Following this stage there is a slight secondary rise before the blood-sugar settles down to its normal fasting level. All the urine specimens from this subject were sugar-free.

Fig. 1 shows also the average blood-sugar curve (dotted line) obtained from *ten healthy individuals* whose ages ranged from 20 to 40 years. The curve displays the same general features as the previous curve. From the resting level of 0·12 per cent. the blood-sugar concentration rises quickly and attains its maximum of 0·17 per cent. in 15 minutes. The time taken to attain the highest point may sometimes be increased; according to MacLean [5] the highest figure may not be attained until as much as one hour after taking the sugar, but in this series the longest time in a healthy adult under 40 years of age has been 45 minutes. Variations, no doubt, depend mainly upon inequalities in the digestive functions, such as the rate of discharge of the sugar through the pyloric sphincter, the volume of the intestinal contents, the extent and nature of bacterial digestion, and the rate of absorption; but, speaking generally, in healthy

FIG. 1.



Sugar-tolerance test: The continuous line shows curve from normal subject; the dotted line is a composite curve from ten healthy subjects aged 20–40 years.

subjects the highest blood-sugar reading should occur within an hour of taking the sugar. The maximum concentration attained varies a good deal; the highest in this series were 0·20 per cent., the lowest 0·16 per cent., a good average being 0·17 to 0·18 per cent. Naturally, as the blood-sugar concentration is changing from minute to minute it is a matter of chance whether one of the quarter-hourly samples coincides with the point of highest rise or not.

Immediately after the maximum figure is reached the blood-sugar begins to fall, and this fall is almost as rapid as the initial rise, so that in a healthy young subject the blood-sugar is usually little above the fasting level some 90 minutes after the ingestion of the sugar; frequently, indeed, it is even below the original level at this time. In this series (Fig. 1) the shortest time for the blood-sugar concentration to swing back to its fasting level was 45 minutes, the longest 120 minutes, and the average time 90 minutes from the taking of the sugar. All the urine specimens from these subjects were sugar-free.

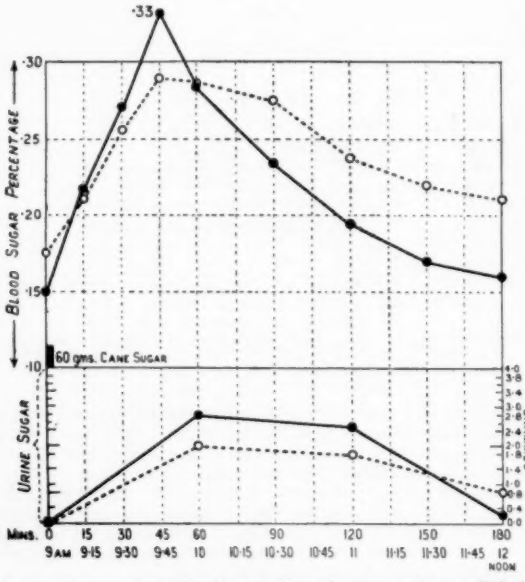
(*c*) *Curves in Diabetes.*

In *diabetes* the blood-sugar curve is of a very different type. Fig. 2 shows such a curve, taken from a case of moderate severity. The blood-sugar rises from the raised fasting level of 0·15 per cent. and reaches the high maximum of 0·33 per cent. after 45 minutes. Thereafter the fall is gradual; even after three hours the blood-sugar has not fallen to its original level. Sugar appeared in the urine, 2·8 g. being present in the first hour's specimen, 2·5 g. in the second, and rather less than 0·2 g. in the third.

In Fig. 2 the dotted line represents a composite curve obtained from *ten diabetic patients* aged 20 to 60 years. The typical features of a diabetic blood-sugar curve are well shown. Starting from the raised fasting level of 0·17 per cent. the blood-sugar rises steadily until, after 45 minutes, it has attained the high maximum of 0·29 per cent. The point of greatest concentration was reached at its earliest in 30 minutes, at its latest in 90 minutes, the average interval being 45 minutes from the ingestion of the sugar. The highest blood-sugar reading at the period of maximum rise was 0·39 per cent., the lowest 0·22 per cent., and the average 0·29 per cent., but the actual height to which the curve rises depends not only on the severity of the disease and the quantity of sugar ingested, but also on the height from which the curve starts and whether this fasting level has been reduced or not by

treatment. Following the attainment of the point of highest rise the blood-sugar concentration begins to fall, but the decline is slow and gradual, so that even after three hours it has not fallen to its original level. In only one of these cases did the blood-sugar regain its fasting level in three hours, in the remaining cases the average estimation at the third hour exceeded the average fasting level by as much as 0·04 per cent.

FIG. 2.



Sugar-tolerance test: Continuous lines show curve from a diabetic subject: the dotted lines represent composite curve from ten diabetic subjects aged 20–60 years.

In each case the specimen of urine taken at the end of the ten hours' fast was sugar-free, but those taken at the end of the first, second, and third hours from the ingestion of the cane sugar all reduced Fehling's solution, an average of 2·0 g. of sugar being present in the first specimen, 1·8 g. in the second, and 0·8 g. in the third.

(d) Comparison of Diabetic and Normal Curves.

When the blood-sugar curve obtained from a diabetic subject is compared with that taken from a young healthy individual (Fig. 3) three important differences present themselves. First, the blood-sugar concentration in the diabetic rises very much higher than it does in the healthy subject and far exceeds the normal renal threshold; secondly, sugar appears in the urine of the diabetic, but not in that of the normal; and lastly—most important of all—in diabetes the blood-sugar takes a very much longer time to return to its original level. Briefly, then, the blood-sugar curve in health shows a rapid rise, an almost equally rapid fall, the maximum concentration does not exceed the renal threshold, and sugar does not appear in the urine; in diabetes, on the other hand, the rise is rapid but much more prolonged, the fall is gradual and long drawn out, the renal threshold is exceeded, and sugar appears in the urine.

Certain features of these blood-sugar variations after taking sugar are not well understood. MacLean has discussed the mechanism fully and the following is based upon his views. The rapid rise in blood-sugar concentration which occurs immediately after the ingestion of sugar is an expression of the fact that absorption into the blood stream is taking place rapidly and, for a while, keeps ahead of the mechanisms of storage and utilisation. The fall, however, which follows in the normal curve so soon after the maximum concentration has been reached is more difficult to explain. It cannot be due to diminution in the rate of sugar absorption, for in the diabetic the blood-sugar continues to rise—in this case for one and a quarter hours after that of the normal had begun to fall, the amount of sugar absorbed during this time being sufficient to raise the sugar content of the diabetic's blood by 108 mg. per 100 c.cm. As the abrupt fall in the normal curve cannot be ascribed to the cessation of absorption it may be due to (1) the sugar being excreted by the kidneys, (2) a sudden rise in the katabolism of sugar, or (3) the sugar being removed from the blood and stored more quickly than it is absorbed. The first alternative can readily be excluded, for all the urine specimens from the normal subjects were sugar-free during the course of the experiment. With regard to the second, there is no doubt that some of the sugar is burnt at once, for it is well known that both heat production and the respiratory quotient rise immediately after a carbohydrate meal, remain raised for some five or more hours,[6] and then gradually fall. In this case, however, the rise and fall in blood-sugar concentration was over in one hour from taking the sugar; if the whole of the latter had been completely metabolised in that time it would represent the utilisation of about 240 calories in one hour from carbohydrate alone. As the subject lay quietly in bed it is hardly possible that this quantity of sugar could have been burnt up in so short a time. Moreover, Johansson[7] has shown that after the ingestion of 200 g. of glucose the rise in carbon dioxide output lasts as long as six hours before falling to the fasting basis. Hence some of the sugar must have been stored in the body.

The rapid fall in the normal blood-sugar curve which occurs so soon after the maximum has been attained must be assumed, therefore, to be due to the sudden intervention of a storage mechanism, the activity of which is so great that the later stages of absorption are completely masked by it. In the diabetic patient, on the other hand, this mechanism is absent or deficient. The diabetic curve is, therefore, a truer picture of the rate of absorption than is the normal, though the result is complicated by a loss of sugar in the urine and by a certain amount of sugar katabolism.

The muscles and liver are the main sugar storehouses of the body; in diabetes the ability to store and to utilise sugar is defective or absent. An immense amount of work has been done during the last decade on the question of sugar storage and the relative parts played by the liver, muscles, and pancreas. The whole question is most complex, but "since glycogen is stored in the liver of depancreatised dogs following the administration of carbohydrate and insulin, and since the respiratory quotient under the same conditions will rise markedly, it is, therefore, evident that the beginning and end of carbohydrate metabolism is dependent upon insulin" (Joslin).[8] It may be assumed, therefore, that just as the prolongation of the blood-sugar curve in diabetes is due to a deficiency in the internal secretion of the pancreas, so is the rapid fall in health dependent on the integrity of the pancreas and its hormone. The exact way in which insulin acts is not yet clear: the experiments of Büchner and Grafe,[9] who found that there was a rise in the oxygen consumption and respiratory quotient of thin slices of various tissues in an oxygenated Ringer's solution containing glucose when insulin was added thereto, show that insulin has an action upon all the organs of the body. It is probable, however, that insulin acts chiefly in the liver and the muscles, its action being of an oxidative-synthetic character which leads in part to the formation of glycogen together with hexose phosphate and intermediate sugars from glucose, and also to an oxidation of the latter.[10]

Another point of interest shown in Fig. 3 is the leakage of sugar which occurs in the diabetic when the renal "threshold" is exceeded. By the "threshold" of the kidney for sugar is meant the percentage level of sugar in the blood above which an amount of sugar recognisable by clinical tests appears in the urine; this definition is only strictly correct if the view that

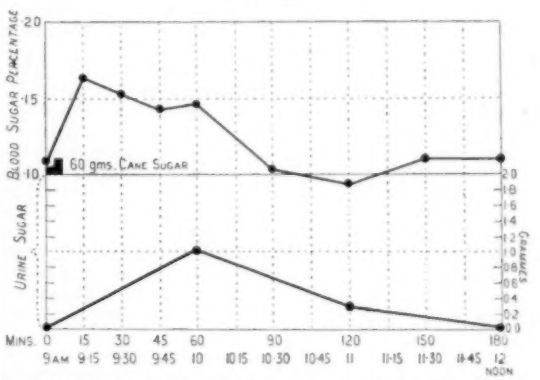
dextrose is absent from the urine of normal individuals is accepted. If, on the other hand, the views of Benedict and Osterberg,[11] who find that dextrose is constantly present in normal urine in amounts up to 0·1 per cent., are held, then there is no absolute renal threshold, and the latter must be defined as the critical point in blood-sugar level below which the sugars of blood and urine run parallel, above which a large excess of sugar escapes into the urine (Macleod).

Whichever view is held there is no doubt that above a certain level of blood-sugar concentration a large amount of sugar appears in the urine; this generally lies in health between 0·16 and 0·18 per cent. for the whole blood, and somewhat higher, about 0·19 per cent., for the plasma. The figure varies in different individuals and, in this series, averaged between 0·18 and 0·20 per cent. for the whole blood. A difference is often observed in the threshold value if the latter is determined both on the basis of a rising and descending curve of sugar concentration in the blood. Thus in Fig. 3 sugar did not appear in estimable quantities in the urine until the blood-sugar concentration had reached 0·21 per cent., whereas it was still being excreted when the blood-sugar had fallen to 0·16 per cent. This phenomenon is of practical importance, and, according to John, "glycosuria must be interpreted not only in its relation to the synchronous blood-sugar content and to the level of kidney permeability to sugar, but also in its relation to the blood-sugar variations during the preceding period during which the urine was secreted."[12]

A striking phenomenon in the curve of the healthy subject (Fig. 3) is the intervention of the storage mechanism directly the blood-sugar concentration approaches the normal renal threshold for sugar. This storage mechanism is so efficient that even if sugar ingestion is pushed to the limit of digestive tolerance it is rarely possible to produce a demonstrable glycosuria in a normal individual. It is, indeed, doubtful if alimentary glycosuria can occur in perfect health; should it occur in a subject with a normal renal threshold for sugar, it indicates a defect in dealing with excess of carbohydrate and, therefore, the patient should be regarded as a potential diabetic.

In many cases of diabetes—in my experience especially the more severe—the renal threshold may be raised. This elevation of the threshold of the kidney for sugar was at one time looked upon as a protective adaptation, limiting as it does the amount of sugar lost in the urine. Nowadays, however, it is generally regarded as being disadvantageous to the patient, for the blood can contain more sugar than usual without its appearance in the urine. Hence urine examination does not give a correct impression of the clinical condition. With the urine containing little or no sugar dietetic restrictions are likely to be relaxed, hyperglycæmia, therefore, will probably occur more often, hyperglycæmia which is probably the cause, and certainly the concomitant, of many of the secondary changes and complications of the disease, and which taxes still further the already overworked and malfunctioning islet tissue of the pancreas.

FIG. 4.

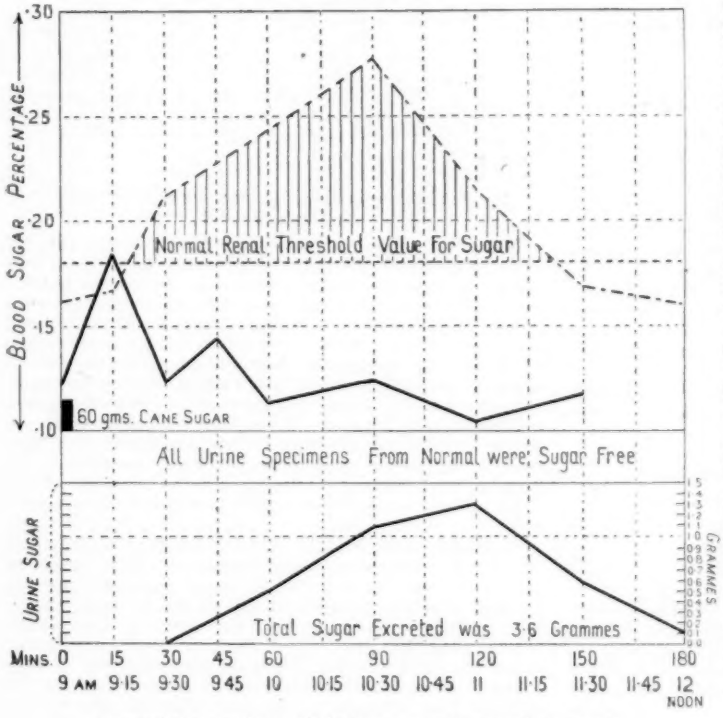


Sugar-tolerance test: Curve from a case of "renal glycosuria."

In a review of 50 cases of diabetes of varying severity Pickering[13] discusses various points connected with the renal threshold from a clinical standpoint. He finds a greater proportion of high thresholds among the mild cases and suggests that a high renal threshold is not necessarily an unfavourable sign. The threshold in his series, however, was not determined by blood-sugar curves, and a comparison of his results with those here recorded would not be strictly accurate.

Just as the kidney threshold for sugar may under certain conditions become raised, so is there a clinical state in which the threshold is lowered. This condition, which is generally known as "renal glycosuria," was described by Klemperer[14] in 1896. The number of cases reported has grown largely since blood-sugar observations became general in the investigation of glycosuria. In most cases the patient is healthy, and the only abnormality discovered is a small amount of sugar in the urine, usually less than 5 g. in the 24 hours. Fig. 4 shows a blood-sugar curve taken from such a case. It presents the ordinary features of a normal blood-sugar curve, the only difference being the slight lowering of the point of maximum rise when compared with

FIG. 3.


BLOOD SUGAR PERCENTAGE
Normal Renal Threshold Value for Sugar
60 gms. CANE SUGAR
All Urine Specimens From Normal were Sugar Free
URINE SUGAR
Total Sugar Excreted was 3·6 Grammes
GRAMMES
MINS. 0 15 30 45 60 90 120 150 180
9 AM 9·15 9·30 9·45 10 10·15 10·30 10·45 11 11·15 11·30 11·45 12 NOON

Sugar-tolerance test: Diabetic curve and normal compared.

that seen in most normal individuals after the ingestion of 60 g. of cane sugar. This is easily understood when it is considered that there is a loss of sugar in the urine directly the blood-sugar concentration rises above the lowered threshold level. The patient from whom this curve was obtained is a young man aged 24, who, beyond some colic delay, is in good health. On a diet of some 2200 calories with 200 g. of carbohydrate he passes about 3 g. of glucose in the 24 hours. The urine does not contain albumin. The glycosuria was discovered during a life insurance examination.

(e) Curves in Old Age and Obesity.

Turning once again to the blood-sugar curve in health it is of interest to note that whereas in infancy and up to 3 years of age the blood-sugar concentration (as Spence has shown [15]) rises but slightly after a dose of sugar, yet as age advances the curve tends to approach the diabetic type in that the rise becomes somewhat higher and the fall more prolonged. The curve from the older subjects has a slightly elevated fasting level, the rise in blood-sugar is slower and more prolonged, the maximum concentration attained is higher, and the fall of the curve more gradual than in youth.

These features are demonstrated also in cases of *obesity*, an inability to deal with excess of carbohydrate being a characteristic of the majority of obese subjects. In a small proportion of cases of obesity, however, the blood-sugar curve suggests an increased rather than a decreased carbohydrate tolerance. It would seem probable that in the early stages of obesity there is an increase in the carbohydrate tolerance—an increase which, no doubt, partly determines the laying down of fat in the storage reservoirs of the body. In later stages, however, owing probably to the excessive and continuous strain on the insulin secreting cells of the body a gradual diminution in carbohydrate tolerance occurs, and, should tolerance still further diminish, diabetes is the natural sequel. The elderly obese diabetic is a common clinical entity, and the association of obesity and diabetes has long been known. The conclusion may be drawn that both in obesity of long standing and in old age the body, presumably through deficiency of the islet cells, is less able to deal so effectively as hitherto with excess of carbohydrate.

(f) Curves obtained with Glucose and Lævulose.

MacLean [5] has shown that all the ordinary sugars—glucose, maltose, galactose, and lactose—give definite sugar curves after ingestion, curves which closely resemble that obtained with cane sugar, though he finds that lactose gives a slow and rather prolonged rise. Lævulose, however, when given in moderate doses, produces no appreciable rise in the blood-sugar concentration in health. Lævulose appears to be normally dealt with in the liver, and should this organ be deficient either as a result of diabetes, toxæmia, or gross disease, then lævulose will give a blood-sugar curve very much the same as that obtained with cane sugar.

On account of this lack of effect on the blood-sugar concentration in health lævulose has come to be used as a test for hepatic efficiency.

DIURNAL VARIATIONS IN BLOOD-SUGAR.

(a) Method.

Throughout a day of 15 hours, in which the subjects of the experiment adhered as closely as possible to their normal existence, blood and urine specimens were collected hourly for sugar estimation. At breakfast a certain proportion of carbohydrate, protein, and fat was taken; at lunch half the quantity of carbohydrate was given, but the same amount of protein and fat as at breakfast; at tea a third of the quantity of carbohydrate, protein, and fat as at lunch, while at dinner were taken the same quantities of the essential foodstuffs as at breakfast. Meals were served to each individual at about the same time, and were eaten as nearly as possible at the same rate.

(b) Variations in Healthy Persons on Ordinary Diet.

The findings obtained in two *normal subjects* on a diet of about 2770 calories made up of 350 g. of carbohydrate, 100 g. of protein, and 100 g. of fat (a normal one for an ordinary workman doing an "eight hours' day") may be given as an illustration. Breakfast (C., 132 g.; P., 30 g.; F., 30 g.) taken between 8.30 and 8.50 A.M. produced a rise in the blood-sugar concentration of both subjects, but more especially in one whose blood-sugar reached the normal renal threshold without producing, however, any glycosuria. By 10 A.M. the blood-sugar had fallen again in both subjects and remained fairly steady until lunch (C., 66 g.; P., 30 g.; F., 30 g.) which was taken between 1.20 and 1.40 P.M. Curiously enough, this meal failed to produce any rise in the blood-sugar in either subject, probably owing to the fact that the carbohydrate was largely given in the form of starch, which is somewhat slowly digested, and hence produces no sudden flooding of the blood stream with the products of carbohydrate hydrolysis. During the afternoon the blood-sugar tended to fall in both subjects, but tea (C., 22 g.; P., 10 g.; F., 10 g.) taken between 4.20 and 4.40 P.M. produced a substantial rise, despite the small carbohydrate intake, and in both subjects the maximum concentration of blood-sugar was attained about 6 P.M. Thereafter there was a sudden fall, and then another rise after the evening meal (C., 131 g.; P., 30 g.; F., 30 g.) which was taken between 7.30 and 8 P.M. Finally, in both subjects the blood-sugar concentration had fallen to normal by 10 P.M.—that is, two hours after the completion of the evening meal. All the urine specimens from these subjects (who were aged 35 and 41 years) were sugar-free.

The rise in blood-sugar concentration which occurred in the above subjects towards the late afternoon has been a constant finding both in the normal and diabetic individuals in this series of experiments. The causation of this is not clear. It can hardly be ascribed to the carbohydrate intake at the afternoon meal, since this amounted—in the diabetic diet—to less than 4 g. It is probable that about this time of the day there is a mobilisation of the glycogen reserves of the body with a consequent increase in the amount of circulating glucose, though the possibility of this rise being due to the gradual production of sugar derived from protein metabolism must also be considered.

(c) Variations in Healthy Persons and Diabetics on Diabetic Diet.

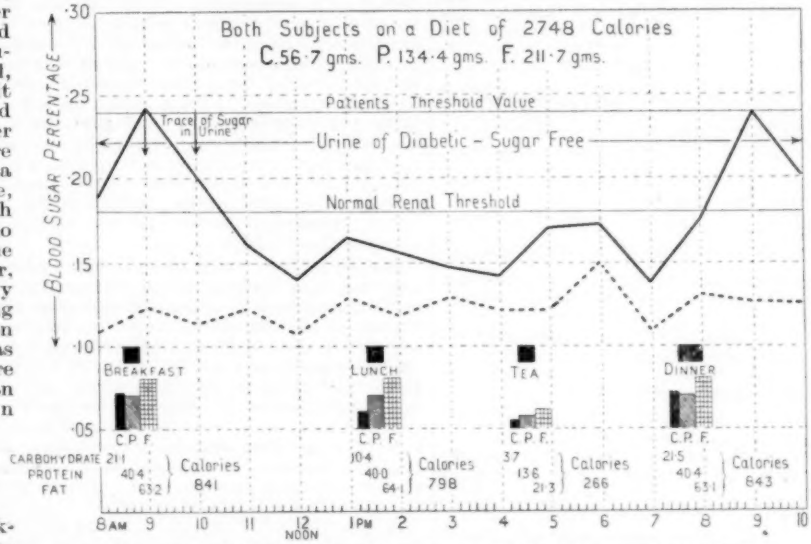
The blood-sugar variations which occur throughout the day in *health* are seen also in *diabetes*, but in this condition they are exaggerated. In Fig. 5 the blood-sugar variations of a *young diabetic* aged 21 are compared with those of a healthy subject of 24 years. Both individuals received a diet of approximately 2750 calories, containing about 55 g. of carbohydrate, 135 g. of protein, and 210 g. of fat. As in the previous experiment, the same quantities of carbohydrate, protein, and fat were given at breakfast and at dinner; half the amount of carbohydrate, but the same quantities of protein and fat as at breakfast and dinner, were taken at lunch, and a third of these latter amounts of the essential foodstuffs were given at tea.

In health both protein and fat produce little or no effect on the blood-sugar; indeed, after protein ingestion "the production of sugar is apparently so gradual that no immediate difference in blood-sugar can be obtained as the result of protein feeding, even in advanced diabetes" (MacLean). It is not surprising, therefore, that the blood-sugar concentration of the normal subject (dotted line) should form a practically straight line throughout the day when the limitation of the carbohydrate intake is considered. True,

MacLean has shown that the ingestion of 20 g. of glucose will produce as high a degree of hyperglycæmia as will a dose of 50 g., but the 21 g. of carbohydrate taken by this subject at breakfast and dinner were mixed with 40 g. of protein and 63 g. of fat, which would retard the processes of digestion and absorption. The blood-sugar of the normal, even on this low carbohydrate diet, showed a substantial rise—to 0·15 per cent.—after tea; this was followed by a rapid fall and then a slight elevation after the evening meal.

The variations in the blood-sugar concentration of the diabetic (who was then an early mild case of three months' duration, and had received dietetic treatment only) were much greater. Starting from the high fasting level of 0·19 per cent., the blood-sugar rose rapidly to over 0·24 per cent. directly after breakfast and then gradually fell until, by noon, it had dropped to 0·14 per cent. There was then a slight rise, but lunch produced no effect on the blood-sugar, which slowly fell during the afternoon until tea was taken; there was then an elevation which reached its maximum at 6 P.M. Dinner, just as breakfast, produced a great rise, the maximum concentration of 0·24 per cent. being attained at 9 P.M., one hour after the completion of the meal. The blood-sugar then began to fall, but at 10 P.M., when the observations were concluded, it was still high—namely, 0·20 per cent. All urine specimens from the normal subject were sugar-free, as were those from the diabetic with the exception of the specimens at 9 and 10 A.M., each of which contained a trace of sugar.

FIG. 5.



Blood-sugar variations of a diabetic compared with that of a normal individual.

(d) Effect of Insulin on the Daily Variations.

The variations in blood-sugar concentration of a healthy subject aged 24 years and a young diabetic aged 21 receiving insulin are described here in illustration. Both individuals were put on the diet of reduced carbohydrate value which was given to the subjects of the previous two observations, and blood-sugar estimations were made hourly throughout the day and night for a total of 23 hours. Urine specimens were collected hourly during the day and twice during the night—at 2 and at 5 A.M.

The normal curve started from a fasting level of 0·13 per cent. and showed a slight rise followed by a rapid fall after breakfast. Thereafter lunch produced a small elevation with a gradual fall during the afternoon; tea resulted in a greater rise, which reached its maximum about 6 P.M., but even the figure at this hour was little higher than the fasting one at 8 A.M. Dinner had scarcely any effect on the blood-sugar concentration, which afterwards fell slowly until 1 A.M., then remained fairly stationary for about three hours and rose again slightly towards 5 A.M. As would naturally be expected, the average blood-sugar level during the night was slightly less than the average level during the day, the latter figure (from 8 A.M. to 9 A.M. inclusive) being 0·124 per cent.; the former (from 10 P.M. to 6 A.M. inclusive) being 0·118 per cent.

The variations in the blood-sugar concentration of the diabetic, a case of moderate severity treated for a month with insulin, were much greater. Starting from the high fasting level of nearly 0·24 per cent. the curve rose, despite the 12 units of insulin which had been given at 8 A.M., to 0·30 per cent., but then a rapid fall occurred, so that the low figure of 0·11 per cent. was reached at noon, this rapid drop being due to the action of the insulin injected at 8 A.M. After lunch there was a steady rise in blood-sugar, which was quickened after tea, and had reached its maximum at 6 P.M. A further dose of 12 units of insulin was given at 7 P.M., and this effectively checked the usual after-dinner rise, the blood-sugar concentration falling uninterruptedly until midnight. There was then a slight secondary rise with a drop at 4 A.M., after which the curve rose and was still rising when these observations were concluded. All urine specimens from both subjects were sugar-free with the exception of those at 9 and 10 A.M. from the diabetic which together contained about 1·1 g. of sugar.

CONCLUSIONS.

(*a*) Cane sugar or sucrose when ingested on an empty stomach by a healthy young subject produces in suitable quantities a definite blood-sugar curve which is similar to that given by glucose when taken in similar amounts under the same conditions.

(*b*) Cane sugar in the diabetic subject under these conditions produces, like glucose, a blood-sugar curve which differs materially from that seen in health.

(*c*) These curves are of value in the diagnosis of anomalous types of glycosuria.

(*d*) Both in advanced years and in obesity of long standing the blood-sugar curve tends to approach the diabetic type; in early cases of obesity, however, the carbohydrate tolerance is sometimes increased.

(*e*) In diabetes—especially the more severe cases—the renal threshold for sugar tends to become raised.

(*f*) The blood-sugar variations during the day on an ordinary diet may in health amount to as much as 0·078 per cent. of sugar. The main elevations in blood-sugar concentration are seen after the meals containing the bulk of the carbohydrate of the diet, but a secondary elevation tends to occur towards the late afternoon, a rise which may be associated with the slow production of sugar derived from protein metabolism.

(*g*) The variations in blood-sugar concentration seen normally in health during the day occur also in diabetes, but in an exaggerated form. These excessive

elevations of blood-sugar concentration can be controlled by insulin injected at a suitable interval of time—about 30 minutes—before the chief meals of the day.

In conclusion, I wish to express my thanks to those members of the staff of Ruthin Castle who allowed themselves to be the subject of experiment, to my colleagues A. J. Leigh, J. S. Jeffery, and T. J. Dobie for the numerous blood-sugar estimations, and lastly to Dr. Spriggs for his kindly help and advice.

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ON THE CAPACITY OF THE KIDNEY FOR CONCENTRATING CHLORIDE.

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IN recent work on the subject of the excretory capacity of the kidneys attention has been focused to a large extent on the excretion of the nitrogenous waste bodies, and the question of chloride excretion has excited but little interest. This comparative neglect is probably in part due to the amount of labour involved in prolonged chloride balance experiments, and the difficulty of carrying out such experiments on sick patients, and in part due to the feeling that the whole question has been settled by the classical work of Widal. The views of this author as to the part played by defective renal excretion of chlorides and consecutive water retention in the production of renal œdema have, however, been gradually losing favour. One may, for instance, cite the findings of Volhard and Fahr, who discovered that during the initial stages of "renal" œdema the blood, far from showing the expected dilution, is actually concentrated, as evidence of the obvious difficulty of accepting a primary renal origin of the dropsical condition. The use of a salt-free diet in the treatment of renal œdema has also not fulfilled our original expectations. The pendulum has, in fact, swung in the opposite direction, and the rôle played by the chlorides in the production of renal œdema is regarded by many authors as altogether subservient to that of the proteins of the plasma. It is widely believed that loss of protein through the damaged renal epithelium leads to such a diminution in the plasma protein content and so alters the osmotic relationships between plasma and tissue fluids that water leaves the blood and enters the tissues. On this assumption variations in the concentration and quality of the proteins determine the distribution of water in the organism. Loeb, however, in his review of the œdema question, concludes that sodium chloride rather than protein plays the predominant part in controlling water distribution in the body. If this is so, the question of the capacity of the kidney for chloride excretion still retains its importance in our investigations of renal dropsy. The following experiments were put through with a view to studying this aspect of renal function.

Renal Capacity for Chloride Excretion.

It is hardly necessary to stress the inconclusive nature, as far as renal function is concerned, of the balance experiments on which the chloride retention theory of œdema rests. It is well known that if the blood content in chloride falls below a certain level, excretion of chloride by the kidney ceases. Instances of such disappearance of chloride from the urine, not due to any functional defect of the kidney but to impoverishment of the blood in salt, are seen in lobar pneumonia and in war gas-poisoning, in both of which conditions exudation of chloride-rich material into the lung leads to pronounced fall in the chloride content of the blood. The apparent chloride retention in such cases is in reality proof of an intact regulatory function of the kidney rather than an excretory defect.

Relatively few workers have attempted to test the renal capacity for chloride excretion directly. Ambard, indeed, has devised a method of estimating the renal threshold for chlorides, based on his ureo-secretory constant; defects in chloride excretion are estimated by the rise in the renal threshold for this salt, the threshold itself being determined indirectly. The method is, however, somewhat elaborate for routine clinical use, and entails assumptions as to the identity or the secretory constant for various bodies, which may well be called in question. Ambard also noted that in man the concentration of Cl in the urine may reach a figure of 1 to 1·3 per cent. The question of maximal chloride concentration has also been studied by Volhard, who states that the highest figure that can be attained by the healthy human kidney is 1 per cent. Adolph and Haldane, giving large doses of salt, found concentrations of 1 to 1·2 per cent. Cl, and Addis in morning urines found figures of 0·82 to 1·35. There is thus a general agreement that in health the urinary Cl may reach a figure of approximately 1 per cent., the highest concentration noted being 1·35. In many of these experiments large quantities of chloride were administered and in addition the water-supply was limited.

Chloride Concentration in the Healthy.

Such conditions cannot, of course, be reproduced in the sick patient, but in a series of experiments on a healthy individual I was surprised to find that a urinary chloride concentration not far below the maximum could be elicited by administering comparatively small quantities of salt. The highest concentration attained by this kidney was 1·03 per cent., after 17 g. NaCl and water deprivation, a nauseating and unpleasant experience. On the other hand, in six experiments with doses of 4 g. NaCl or KCl, taken in cachets and washed down with 200 c.cm. of water, an average concentration of 0·905 Cl was reached, the maximum figure being usually attained in the third hour of the test. The range of the highest concentrations in these experiments was from 0·84 to 0·94 per cent. The plasma chloride was estimated during the second hour of the test with a view to establishing a constant relationship between plasma and urinary chloride. The figure obtained varied between 0·369 and 0·380, but no such constraint relationship could be found. A larger diuresis followed the potassium salt than the sodium, potassium salts being active diuretics,

and some idea of the capacity of the kidney for water excretion may thus be obtained. This diuresis, however, does not appear to interfere in any way with the final concentration figure, the mean of the urinary chloride concentrations during the third hour being identical with that obtained after sodium chloride.

Twenty normal individuals were subsequently tested with a dose of 4 g. of potassium chloride and 200 c.cm. of water, the urine being collected hourly for three hours. No restrictions were placed on the previous intake of food or drink, the test being started two hours after a self-chosen breakfast. The initial concentrations of chloride in the urine, before the test was given, varied from 0·1 to 0·89 per cent., and did not appear to exercise any appreciable influence on the final figures obtained. The average concentration of chloride contained during the course of test was 0·915 per cent., with an extreme range of 0·72 to 1·07 per cent. In only two cases did the maximum concentration, which was usually attained during the third hour, fall below 0·80 per cent. (0·72, 0·79). The average plasma chloride content 90 minutes after administering the dose was 0·376 per cent., with a range of 0·369 to 0·384.

It would seem, then, that in normal individuals a comparatively small dose of chloride will in the great majority of healthy individuals lead to the excretion of a urine containing more than 0·8 per cent. Cl, and that this level is attained with sufficient constancy to serve as a basis for testing the ability of the kidney for concentrating this radicle. Such variations as occur are of the order usually met with in functional tests, and may probably be attributed in part to individual peculiarities of the renal tissue, and in part to the impossibility of exactly reproducing the stimulus to which the organ is subjected.

Chloride Concentration in Chronic Interstitial Nephritis.

Turning now to cases of renal disease, and taking in the first place patients suffering from chronic interstitial nephritis, we should, of course, expect such patients to show a loss of concentrating capacity for chlorides when examined by the method detailed above. Actually the capacity of such kidneys for concentrating chlorides is found to be grossly impaired, and in the severer types of the disease a high grade of fixity of concentration is noted. Thus in a patient whose maximal concentration, as tested by the urea-concentration test, amounted to 0·75 only, the concentration of chloride in the urine during the three hours after the administration of 4 g. KCl were 0·20, 0·22, and 0·19 per cent., the concentration of the urinary chloride before administration of the salt being 0·20. Taken as a whole, the impairment of the capacity of concentrating chloride in these patients runs closely parallel to the loss of the urea-concentrating power. It is remarkable that in these cases the plasma chloride may remain at a normal level even though definite nitrogenous retention is present; in a small series the figure during the second hour of the test averaged 0·375, the highest level attained being 0·404. The absence of hyperchloræmia is not apparently accounted for by retention of water in equivalent amounts to the retained salt, since these patients showed no œdema. Veil has, indeed, noticed an excess of chloride in the blood of interstitial nephritis after heavy salt ingestion, and Mayrs has observed a definite hyperchloræmia after doses of 8 and 12 g. of NaCl. The fact, however, remains that with apparently equal impairment of the capacities for concentrating urea and chloride, gross accumulations of the former are found in the blood, while the latter remains at a relatively constant level. Mayrs suggests that the normal plasma chloride in nephritis patients under hospital treatment must be largely due to a restricted diet. It may be noted, however, that there is some evidence that "dry" retention of chloride may occur, and that depôts for chloride storage exist in the body. The plasma chloride may in advanced cases of interstitial nephritis fall to a very low level, but such hypochloræmia has invariably, in my own experience, been the result of uræmic vomiting with consequent chloride loss, and I see no reason to assume with Veil that it is indication of a profound disturbance of chloride interchange between blood and tissue fluids.

From the point of view of chloride excretion, patients showing œdema are of greater interest. Thirteen cases of this type were available for examination, and may be divided into two well-defined groups.

The first group comprises three cases showing all the characteristics of well-developed chronic parenchymatous nephritis—gross œdema, effusion into the serous cavities, and high grade albuminuria and oliguria. The maximum concentrations to the urea-concentration test were 4·9 per cent., 2·2 per cent., and 1·2 per cent., the last patient alone showing definite impairment of nitrogenous excretion. In startling contrast to these figures are the results of the chloride-concentration test, which was performed in all nine times on these three patients. A typical response may be cited.

	Cl per cent.	Urine passed.	Cl grammes.
First hour	0·015 ..	10·5 c.cm. ..	0·0015
Second hour	0·017 ..	6·5 c.cm. ..	0·0016
Third hour	0·005 ..	7·0 c.cm. ..	0·0010

As will be seen, the amounts of chloride passed and the concentrations attained are entirely negligible, though on the following day this patient gave a response of 4·95 per cent. to the urea-concentration test. At first sight, then, it would seem that a complete dissociation of the capacities for concentrating urea and chlorides is present. An examination of the plasma chloride, however, suggests that another explanation is possible. The plasma chloride in this particular patient was at a level of 0·352 per cent. during the second hour of the test while the average figure for the series was 0·349 per cent. Eight samples of ascitic or œdema fluid were obtained from these patients and showed an average chloride content of 0·405 per cent. (range 0·385–0·427). If we admit that a threshold figure of plasma chloride exists below which the kidney practically ceases to excrete the radicle, another interpretation of the seemingly complete inability to excrete chloride suggests itself. The level of plasma chloride in these patients, even after a dose of salts, approximates that usually given for the renal chloride threshold, while the œdema fluid shows a much higher chloride content than the blood. It would seem that the disappearance of chlorides from the urine of these patients is the result of the impoverishment of the blood in chlorides and their accumulation in the tissue fluids rather than of a gross renal functional defect. In the only patient in whom an improvement occurred, it was noted that simultaneously with the disappearance of the œdema the plasma chloride rose to a normal figure (0·378), while at the same time the response to a chloride-concentration test rose from 0·015 to 0·63 per cent. In spite of this striking improvement in the urinary chloride concentration, a very high grade of albuminuria persisted and the centrifuged deposit still showed numerous tube casts. From this point of view the renal condition showed no such rapid improvement as one frequently sees in an acute glomerulo-nephritis with onset of diuresis and subsidence of the œdema. The direct evidence obtainable from urinary examination, therefore, does not suggest that the sudden improvement in chloride concentration is the result of a corresponding improvement of the pathological condition of the kidney. It is unfortunate that the cases of typical parenchymatous nephritis which came under examination were so few in number, but the facts observed are suggestive. It would seem that

in these patients the kidney probably lacks opportunity rather than capacity for excreting chlorides, that the diversion of chloride and probably water from the blood to the tissue spaces leads to the almost total disappearance of chloride from the urine and to the extreme oliguria, and that, given the opportunity, the kidney still possesses a very fair capacity for chloride concentration. The œdema is, in fact, rather of extrarenal than of renal origin and results from a general alteration in the capillary permeability of the body. It is probable that the seeming dissociation of the capacities of the kidney for urea and chloride concentration is apparent rather than real, and it is questionable whether these cases form an exception to the general rule that the various concentrating capacities of the kidney are closely interrelated.

Chloride Concentration in Cases with other Renal Lesions and Dropsy.

The second group of œdematous cases examined, ten in number, present a striking contrast to the first. In all a renal lesion was present, as evidenced by albuminuria and casts, and no other cause for the œdema could be found. The dropsy was, however, less well developed than in the parenchymatous nephritis, and no appreciable effusion into the serous sacs was detected in any of these patients. The group included such conditions as pre-eclampsia and eclampsia, acute glomerulo-nephritis, chronic nephritis, complicated by pregnancy, persistent œdema of the legs with albuminuria after acute nephritis and exacerbations of chronic nephritis. The response to the chloride-concentration test in these cases was relatively good and in two cases reached a figure in excess of 0·80 per cent. Where impairment of chloride-concentration was present, a correlated and roughly equivalent impairment of the power of concentrating urea was noted. No such extreme failure of chloride-concentrating power was noted as appears to be the rule in chronic parenchymatous nephritis; the lower range of chloride concentration obtained was in the neighbourhood of 0·15 to 0·20 per cent.—that is, about at the level frequently seen in chronic interstitial nephritis. The average content of plasma chloride during the test was 0·386 per cent., varying from 0·367 to 0·404; the plasma chloride is thus slightly in excess of the normal figure. No samples of the tissue fluids were obtained. It does not appear that the œdema present in these cases could be attributed to loss of the capacity of the kidney for chloride concentration, since as low or lower chloride concentrations may occur in interstitial nephritis free from any trace of dropsy. The group as a whole showed, however, a somewhat impaired diuretic response to the potassium salt, as compared with the normals and with other nephritics free from dropsy.

Conclusions.

1. A simple method is suggested for testing the capacity of the kidney for concentrating chlorides. 2. The capacity of the kidney for chloride concentration appears to run parallel with its power of concentrating urea, both functions being affected in disease to an approximately similar degree. 3. An apparent dissociation of the two functions is seen in cases of parenchymatous nephritis with gross anasarca, but it would seem that this is merely the result of impoverishment of the blood in chloride.

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WE are asked to state that the British South Africa Company no longer acts as London agents for the Government of Southern Rhodesia. The offices of the High Commissioner for Southern Rhodesia are at Crown House, Aldwych.

A CASE OF
POST-OPERATIVE TETANUS WITH IDENTIFICATION OF THE ORGANISM.

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THE rarity of tetanus following operation with present-day aseptic technique, and the fact that in this instance the diagnosis, which would have been doubtful on clinical grounds alone, was proved by the identification of the organism, form the justification for the publication of the following case.

Clinical History.

Patient was a married woman, aged 38, of rather neurotic temperament. She had had one previous pregnancy which had ended in craniotomy on account of "contracted pelvis." When she became pregnant a second time it was therefore decided that delivery should be by Cæsarean section. Labour commenced at 10 P.M. on Feb. 16th, 1926. No examinations were made; labour was allowed to proceed for one and a half hours and the section was then performed, resulting in the delivery of a healthy male child. The operation presented no unusual difficulties; the uterine wound was closed with divided catgut sutures and a continuous stitch of the same material; the wound in the abdominal wall was closed in the usual way. For two weeks after the operation all went well. The lochia were entirely normal, and the wound in the abdominal wall healed cleanly. Involution of the uterus took place at a normal rate. Preparations were in train for the removal of the patient and her baby to her own home, when on March 4th she complained that her tongue felt swollen and her jaws stiff. On the morning of the following day the patient presented a risus sardonicus, and there was some trismus and retraction of the neck. There was no stiffness of the muscles of the trunk or limbs, the reflexes were not increased, and there was no indication of spasm other than that of the muscles of the face and neck. On the strength of such symptoms as existed the patient was given 100,000 units of antitetanic serum, 20,000 units into the spinal theca, and the remainder intramuscularly. The temperature in the evening rose to 101° F.

On March 5th the patient appeared to be better. The retraction of the neck had disappeared, the trunk and limb muscles remained unaffected, and the nurse stated that during sleep the patient's mouth fell open. In the absence of any very definite symptoms of tetanus, and in view of the patient's neurotic temperament, very considerable doubt began to be felt as to whether there was any tetanic infection at all. This doubt was much strengthened when interrogation of the patient's husband elicited the extraordinary fact that the patient had dreaded getting tetanus after the operation, and had even approached her own medical practitioner with a view to getting him to give her a prophylactic dose of antitetanic serum. It appeared that this dread on the part of the patient arose from the fact that in her youth she had seen a case of tetanus in a farm hand and was therefore more or less familiar with the symptoms. During the afternoon of this day the patient developed a series of spasmodic attacks in the course of which she clenched her teeth, held her breath, and became cyanosed. The trunk and limb muscles remained unaffected; during some of the attacks there was incontinence of urine and fæces. The temperature varied between 100° and 101°.

On March 7th the patient was quiet and fairly free from the spasmodic attacks until the middle of the afternoon. By this time a definite decision had been reached that the symptoms were neurotic in nature, and arrangements were being made for the transfer of the patient from the surgical ward in which she had been treated, when she suddenly had another spasmodic attack, and conclusively confuted the diagnosis of a neurosis by dying a few minutes after its apparent subsidence.

Autopsy.

Post-mortem Examination.—March 9th, 1926: The body was that of a somewhat emaciated female; breasts full; on the abdomen in the mid-line was a completely healed surgical wound. Brain: Vessels very congested; no other signs of abnormality. Thorax: Lungs normal; some froth in the trachea; early atheroma of the aorta, in particular about the mouths of the vessels. Heart: Nothing abnormal. Abdomen: The wound in the abdomen showed no collections of pus; healing of all layers of the wall had occurred, and there were no adhesions between the deep aspect of the scar and the underlying viscera. The uterus was contracted down so that its upper pole just reached

above the edge of the pubic bone. On separating the anterior surface of the organ from the overlying structures pus became apparent. On further separation this was found to be coming from a wound in the long axis of the uterus extending from the upper pole into the lower segment. The edges of this wound were easily separable, and showed much suppuration; lying in the wound was a long catgut ligature. This was removed, placed at once in a sterile test tube, and kept for culture. Portions of the suppurating edges of the uterine wound were also taken and kept for culture. The interior of the uterus showed no collection of pus. The uterine adnexa showed no abnormality. Kidneys: Very congested but otherwise normal. Spleen, soft and friable, but not greatly enlarged. Other organs: Nothing abnormal.

Bacteriological Examinations.—Films of the pus from the uterine wound showed Gram-positive cocci and Gram-negative bacilli only. Aerobic plate cultures gave a pure growth of *Staphylococcus aureus*. Anaerobic cultures in bullock's heart broth were made as follows: (*a*) Of the catgut ligature referred to above; (*b*) and (*c*) of portions of suppurating tissue from the edges of the uterine wound. All cultures were incubated for 48 hours.

On examination by film, culture (*a*) showed numerous morphological *B. tetani*. One of the cultures from the uterine tissue showed the same organism in smaller numbers: the third culture showed no tetaniform organisms. All three cultures showed various other types of anaerobic organisms, but no other end-sporing types.

Animal Experiments.—(1) March 12th, 1926: Two guinea-pigs used, at 11.30 A.M. Guinea-pig 1 (control) received intraperitoneally 5 c.cm. mixed anti-gas gangrene serum and 500 units antitetanic serum. Guinea-pig 2 received by same route 5 c.cm. anti-gas gangrene serum only. 5.30 P.M.: Both guinea-pigs were inoculated in the right thigh with 1 c.cm. of culture (*a*). This had stood overnight in the ice chest. Six hours previous to inoculation 2 c.cm. of the culture were mixed with 10 c.cm. of anti-gas gangrene serum. Each of the guinea-pigs received 6 c.cm. of this mixture. Both guinea-pigs were kept under observation for two weeks, but neither showed any ill-effects.

For various reasons work on the cultures at this stage had to be suspended until the middle of April. As it was thought that the nature of the medium might have had something to do with the failure to produce tetanus in guinea-pigs in the first experiment it was decided to perform a second experiment, using an ascitic broth culture. Subcultures were therefore made from the original meat broth culture into ascitic broth and incubated anaerobically. After three days' incubation these cultures showed numerous tetaniform bacilli. It was also considered possible that there might be traces of tetanus antitoxin in the anti-gas gangrene serum used to barrage against the gas-forming anaerobes, and it was decided to omit the use of this serum.

Experiment (2).—A third subculture into ascitic broth incubated for three days was used. Guinea-pig 1 (control) received 500 units of antitetanic serum intraperitoneally. It was then inoculated with 1 c.cm. of the culture in the right thigh, the injection of the culture being immediately followed by 1000 units of antitetanic serum. Guinea-pig 2 received 1 c.cm. of the culture alone. Neither of the guinea-pigs showed any ill-effects.

By this time considerable doubt was being entertained as to the nature of the tetaniform organism. It was decided, however, to perform one more experiment, taking advantage of the known catalytic effect of the presence of silica along with the organisms. For this purpose a 48 hours subculture into meat broth from the ascitic broth was used.

Experiment (3).—April 24th, 1926: A quantity of ordinary sand was heated in a crucible over a bunsen flame for one hour. At the conclusion of this heating it was poured into a test tube full of sterile saline, and allowed to stand for a few minutes. The coarser particles settled to the bottom, leaving the finer particles in suspension. Guinea-pig 1 (control) received 1 c.cm. of this suspension into the right thigh. Guinea-pig 2 received 1 c.cm. of the sand suspension followed by 1 c.cm. of the culture.

At 11 A.M. on April 25th guinea-pig 2 showed an intense and very characteristic spasm of the injected leg. It was not seen again until 5 P.M. It was then in a condition of intense general spasm. All four legs were in extension and the whole body bent backwards and to the right so that the nose almost touched the thighs. So severe was the condition that the animal was at once chloroformed. At post mortem the site of inoculation showed œdema, but no pus formation. Films showed no organisms and only a few pus cells. Cultures from the œdema fluid incubated anaerobically for three days showed numbers of *B. tetani*.

Discussion.

The point of greatest interest is the extreme difficulty presented by the diagnosis during life. Matters were very much complicated by the fact that the patient was a neurotic woman, and that she had before the operation harboured a dread of tetanus. When she developed a risus sardonicus after the operation it was inevitable that suspicion of a neurosis should be aroused, and this was strengthened by the absence of other well-marked symptoms of tetanus during the ensuing days up to the time of death. The spasmodic attacks appeared to be entirely confined to the muscles of the face and throat, and were quite different from the spasms seen in an ordinary case of wound tetanus. In fact, almost the only characteristic sign of tetanus which the patient presented, apart from a risus sardonicus, was cessation of life. Why death occurred it is difficult to say. The spasms did not last long enough to cause death from asphyxia, and there was no exhaustion such as is seen in a well-developed case of tetanus. It would appear that the tetanus toxin has potentialities for damage beyond its mere power of producing spasm, to an extent not usually realised.

The fact that on culturing portions of the uterine tissue, and also of the catgut used in suturing that organ, the tetanus bacilli were obtained in by far the greatest numbers from the catgut would appear to implicate the ligature as the source of the infection. Two other samples of catgut from the same lot, but not from the same phial, were examined anaerobically, but neither gave any growth.

From the bacteriological standpoint it is interesting to note the very powerful effect of the addition of a little sand to the cultures of the tetanus bacillus.

Summary.

1. A fatal case of tetanus following upon Cæsarean section is described.
2. The catgut used in suturing the uterus is implicated as the source of the infection.
3. The diagnosis was rendered difficult by the ill-marked and mild nature of the symptoms and the fact that the patient was known to harbour a fear of tetanus.

The sole share of the author in this case was the performance of the post-mortem examination and the bacteriological procedures, and his thanks are due to the surgeon in charge of the case for his kindness in providing full clinical details.

Clinical and Laboratory Notes.

FULMINANT CASE OF ACUTE POLIOMYELITIS OF BULBAR TYPE.

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THE following case presents sufficient features of interest to make it worth recording.

A girl, aged 11½, had been in her usual health until about midnight on June 2nd–3rd, when she called out, "Mother, I'm sick." She vomited once, and for the rest of the night was restless, and a little delirious, only sleeping at intervals. Next day she got up as usual, but did not go to school. Nothing definite was noticed. She went to bed in the usual way that night, and next morning, June 5th, she got up about 10.30 o'clock and played about with her brother. About 1.30 P.M. the child was looking ill, and was sent to lie down. At 6.30 P.M. (that is about 42 hours after the previous vomiting) she vomited again, bringing up some frothy white material. She now complained for the first time of some difficulty in swallowing, but it was not pronounced. From this time onwards the difficulty of swallowing increased, and by 10 o'clock that night she could not swallow at all. Even a little milk put in the mouth was churned about, and eventually put out.

Condition on Examination.—At 11.30 A.M. on June 6th, when I was called to see her, the temperature was 103° F., pulse 120, respiration 26. She was frothing at the lips, restless, and in a state of great alarm. There was no squint or inequality of the pupils. When water was given to her she appeared to roll it round in her mouth, and the froth about her lips increased. She kept pushing the head forwards, and the larynx rose up, but no liquid seemed to

go down the œsophagus. It was not possible to make a complete examination at the moment, but there was nothing abnormal to be seen in the pharynx. Before I could make a second visit death had occurred. The parents say that about 1.30 P.M.—that is, two hours after I saw her—she became very excited, went stiff, and clutched at the bed-rail, struggling up to the time of her death. She did not go blue. Death occurred at 2 P.M. on June 6th. Permission for autopsy was not obtained, but the throat was carefully examined and nothing abnormal found.

Commentary.

Here we have an acute illness fatal in 62 hours. There is an onset with vomiting, and general toxic symptoms, restlessness, malaise, delirium, and after an interval of about 40 hours the localising symptoms show themselves, in this case limited to dysphagia, suggesting serious damage to some part of the lower medullary region. At the same time there was evidence of general infection from the temperature and pulse. There was no history of any injury, no drugs of any kind had been taken, and the differential diagnosis seems to lie between two infections, each of neurotropic type, acute poliomyelitis and epidemic encephalitis. In favour of acute poliomyelitis is the age of the patient, the onset with vague febrile symptoms a few hours before the appearance of local paralysis, the extreme severity of this latter, and its limited extent. It is impossible on the data to exclude epidemic encephalitis; indeed, cases of a somewhat similar type have been recorded from time to time, and referred to as "hydrophobia-without-the-dog." Arthur Hall records a case of this kind in a woman in whom hydrophobia was suspected and tracheotomy had to be performed.[1] Cases have also been described by Denyer and Morley in a young man,[2] Kahn, Barbier and Bertrand[3] in a woman of 52, and Sarkies[4] in a medical man. These cases, however, differed in certain respects from my case. In all of them there were violent spasms of the larynx, which were increased by attempts to swallow, whilst in my case the trouble appeared to be limited to the loss of swallowing. It is possible, however, that after I saw her such spasm of the larynx may have occurred, and indeed some further extension of the trouble must have taken place to cause her sudden death.

Apart from these rarer bulbar cases seen in epidemic encephalitis, dysphagia of a temporary kind is by no means uncommon as an early symptom in this disease. It is, however, usually accompanied by other evidences of cranial-nerve involvement, ocular, facial or tongue palsies. Moreover, it is unusual for these early cranial nerve palsies of epidemic encephalitis to be the cause of death, or for death to occur during their existence. It is a somewhat surprising fact that the toxin of epidemic encephalitis seems to flit about the bulb causing a palsy on this side one day, a palsy on the other side the next, and yet seems to avoid the vital centres. It is rare for death to occur at this period, when bulbar-pontine palsies are occurring. Further, as is well known, these early cranial nerve palsies are rarely permanent; the damage seems to be less than destructive. That acute poliomyelitis may involve the brain stem is well known, and such cases may be rapidly fatal. Feiling[5] records a case in a youth of 19 who began to feel ill on Nov. 19th, 1913, with a peculiar feeling in the throat. Two days later he had difficulty in swallowing, and weakness in the left leg. The dysphagia became complete, there was pyrexia, and a year later he had an attack of severe dyspnœa and a convulsion, and died a few hours later. Definite signs of acute poliomyelitis were found in the central nervous system. Feiling's case was published before the question of epidemic encephalitis as a separate entity had arisen, but the clinical account of it does not suggest the latter disease. Poole[6] in 1925 recorded two cases of what he termed acute polio-encephalitis. Both had dysphagia amongst other bulbar symptoms, and died within a few hours of admission. He discusses the diagnosis between Heine-Medin's disease and epidemic encephalitis, without making it very clear as to which way his own opinion leaned. Apparently there was no autopsy in either of his cases.

It seems on the whole probable that the case which I have recorded was one of acute poliomyelitis (polio-encephalo-myelitis) limited to the bulbar region.

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A CASE OF COMPLETE SUPPRESSION OF URINE FOR THREE DAYS.

BY A. LESLIE LANKESTER, B.A.CAMB., M.R.C.S.ENG.,
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THE case here related is of interest not only on account of the long period of anuria, but also because of the large amount of pilocarpine which was given before the skin reacted.

E. S., a primigravida of 41, was attending the antenatal department of Queen Charlotte's Hospital and was under treatment for albuminuria. The treatment had been dieting, by the restriction of proteins, and the administration of alkalies and saline purges. During the night, Oct. 29th–30th, she slept badly, and in the early morning there was a small loss of blood from the vagina. The patient also had some "giddiness" and some "biliousness." A further loss caused her to come up to the hospital, and she was admitted at 11 A.M.

Condition on Admission.—The patient was very pale, pulse 64, temperature 95·6° F.; ankles slightly œdematous; systolic blood pressure 160 mm. Hg. She complained of slight epigastric pain and a few specks before the eyes. Mentality was perfectly normal and the patient was only worried about herself because of the bleeding. The uterus was fairly hard but not specially tender, and normal elasticity was not present. Maturity was about 34 weeks. There was a steady trickle of blood from the vagina and the edge of the placenta was felt through the cervix. A diagnosis of placenta prævia was made and the pallor was thought to be due to loss of blood.

She was put to bed, kept warm, and watched. The bleeding continued and at 4 P.M. it was decided to plug the vagina. She was given an anæsthetic, the membranes were ruptured, and the vagina firmly packed with three 6-yard rolls of 6-inch gauze.

The patient took the anæsthetic badly, the pulse being barely perceptible most of the time, but there was no further loss. An injection of 1 c.cm. of pituitrin was administered and rectal salines were given. At 7 P.M. she was very restless and delirious. At 9 P.M. she was intensely anæmic, the mucous membranes being almost lemon-coloured, and the respirations were becoming stertorous. She had a curious "barking" cough and frequently vomited a dark-brown fluid.

No urine had been voided since admission to the hospital. A catheter was passed and the bladder was found to be empty. Her condition was so bad that any radical treatment was contraindicated. A diagnosis of combined toxæmic accidental hæmorrhage and placenta prævia was made and restorative treatment adopted, the prognosis being regarded as hopeless.

The colon was washed out with saline, and an intravenous saline containing sod. bicarb. gr. x. ad 1 pint given. Hot packs were applied in an effort to get the skin to act, pilocarpine, gr. ½, subcutaneously, and ergotin, 1 c.cm., intramuscularly, being injected. By 11 P.M. she was in deep coma, respirations hardly perceptible, the pulse impalpable, and the heart sounds only faintly heard with a stethoscope. Oxygen and camphor, gr. iii., in oil with strychnine and digitalin hypodermically were given as cardiac stimulants. At midnight the pilocarpine, gr. ½, and ergotin, 1 c.cm., were repeated. There was no change in the condition.

Rectal salines were still being administered every hour and were retained, and at 2 A.M. on Oct. 31st she was given a steam vapour bath and the pilocarpine, gr. ½, repeated. The blood pressure was now 136 mm. No moist sounds were heard at the bases of the lungs. An hour later, 3 A.M., there was some vasodilatation, and a few moist râles in the lungs, indicating that the pilocarpine was acting. The vomiting recurred on one occasion, otherwise the patient was in deep coma, but the respirations improved slightly as the skin began to act.

By 4 A.M. the skin was definitely acting and perspiration became visible. Her general condition was slightly improved and she appeared to be having definite uterine contractions.

At 5 A.M. the plugging was removed from the vagina, and a quarter of an hour later she delivered herself of a still-born fœtus. The placenta and membranes rapidly followed, together with some retroplacental blood-clot. At one edge of the placenta the area over the os could be easily determined, and at the opposite side there was retroplacental blood-clot. At 6 A.M. she was sweating profusely and the blood pressure had dropped to 116 mm. Hg. Consciousness was returning. No urine had been passed. During the day, however, she gradually improved, though she was drowsy to a degree approaching coma. Her face became more puffy and the œdema of the legs was more marked. Sweating was maintained by a further injection of pilocarpine, gr. ½.

On Nov. 1st she was still improving but no urine was passed. In the evening, at 7 o'clock, a catheter was passed and 7 oz. of urine drawn off. This contained a large amount of albumin and many casts, blood cells, and pus. The urea was 0·7 and the chlorides 0·27 per cent. As, by the history, she had not passed urine since the evening before admission, she had had complete suppression for 72 hours.

On Nov. 2nd 13 oz. were passed naturally, and on the 3rd 65 oz. She was now taking a large amount of fluids by the mouth, and on Nov. 4th she passed 140 oz.

She made an uninterrupted recovery and was discharged on Nov. 26th feeling quite well, with the urine free from albumin.

The administration of ergot intramuscularly at three-hourly intervals undoubtedly stimulated the uterus to expel its contents and so made recovery possible.

I am indebted to Mr. L. C. Rivett for permission to publish this case.

A CASE OF ADENOMA OF THE JEJUNUM CAUSING INTUSSUSCEPTION.

BY R. CHARLES B. MAUNSELL, F.R.C.S. IREL.,

PAST PRESIDENT OF THE ROYAL COLLEGE OF SURGEONS IN IRELAND; SURGEON TO MERCER'S HOSPITAL, DUBLIN; PRESIDENT OF THE SURGICAL SECTION, ROYAL ACADEMY OF MEDICINE IN IRELAND.

THE following case is of interest on account of its rarity and also as an example of the impossibility of making a diagnosis in some abdominal conditions without the aid of an exploratory operation.

E. M., female, aged 26, was sent to me on March 31st, 1926. She had been complaining of abdominal pain and vomiting for two years and, in spite of prolonged hospital treatment, the symptoms had become worse. The pain was situated in the upper abdomen and also in the back at the same level, and sometimes, if she turned on her right side, she felt a "gushing" starting from her back and travelling

FIG. 1.—Six-hour retention of barium meal in third stage of duodenum.

around the left side. The ingestion of solids or fluids increased her pain, and fluids gave her a feeling of great distension. When she vomited the pain became very intense for some minutes, but then died away, except from her back where it was almost continuous. She often put her fingers down her throat in order to hasten the emptying of her stomach. The vomited material always contained bile, but she never noticed any blood. She stated that on many occasions her motions were black in colour, and sometimes she passed red blood. For the past few months she had lost flesh and had become weak and suffered from "lightness in the head." Her bowels have been constipated and she frequently took aperients.

Upon examination she was fairly nourished, but was extremely anæmic, Hb., 30 per cent.; W.B.C. 5466 per c.mm., R.B.C. 4,820,000. She remained in hospital for five weeks before operation, and during that time her pulse, temperature, and urine remained normal. There was at no time blackness of the motions, nor was any red blood passed, but "occult blood" was demonstrated in the fæces. Palpation and percussion revealed nothing except slight tenderness in the upper abdomen.

A provisional diagnosis was made of gastric ulcer or duodenal ileus, or a combination of both, and she was referred to the X ray department. The following extracts from the radiologist's report are of interest: "Stomach—normal in position, size, shape, and tone, and the evacuation of its contents was fairly free. There was some tenderness over the pylorus and duodenum. There was marked delay in the third part of the duodenum, and in six hours, when the stomach had emptied completely, there was a residue still present in the duodenum (Fig. 1). The diagnosis is uncertain, but some mechanical obstruction involving the third part of the duodenum is suggested. It is probable that the second and third parts are considerably dilated. The obstruction may be due to pressure of the mesenteric artery, but there is no pronounced visceroptosis." Upon reading this report we felt quite confident that the provisional diagnosis was correct, and on May 7th I opened the abdomen.

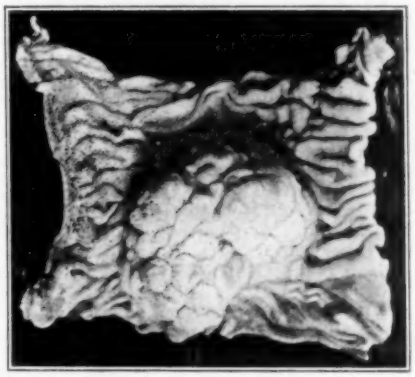


FIG. 2.—Sessile adenoma of the jejunum.

Operation.—The stomach and upper portions of the duodenum were normal. When the transverse colon and mesocolon were turned up a very curious condition was seen. Intestine, several inches in circumference, appeared to emerge from a depression in the transverse mesocolon at the point which should have been the site of the duodenal jejunal flexure. This enlarged intestine could be traced down for 9 or 10 inches before it tapered into normal jejunum. Examination showed that it was an intussusception, the neck of which, in its efforts to swallow the duodenum, had formed a depression in the transverse mesocolon. The distal portion of the intussusception was withdrawn from the abdomen, and by careful manipulation the intussusception was squeezed back. A soft mass could then be felt in the lumen of the intestine, it appeared to be about the size of a golf ball, to be sessile, and situated about 8 inches from the duodeno-jejunal flexure. About 3 inches of the intestine was resected and continuity re-established by end-to-end anastomosis. No other tumour was felt in the abdomen. The pathologist reports that the tumour is an adenoma (Fig. 2). The patient has had no symptoms since the operation, and is rapidly regaining her normal strength and complexion.

I had only once previously met with an adenoma of the jejunum, and it also caused an intussusception. I operated upon the patient some 20 years ago and, although the notes and specimen have been mislaid, I have a very distinct recollection of the case.

The patient was a young man, aged 25 years, who suffered periodically from intense abdominal pain sometimes accompanied by vomiting. Many diagnoses had been made, including hysteria and malingering, but luckily the house surgeon was present during one of the attacks and he thought that he could feel a tumour in the upper abdomen. When I examined the patient next morning this tumour could not be felt. I opened the abdomen and found evidence of a recently reduced intussusception, 2 feet below the duodeno-jejunal flexure, and I removed a pedunculated adenoma from the lumen of the intestine.

In conclusion, I wish to thank my colleagues, Dr. Leonard Abrahamson for medical consultations, Dr. T. G. Hardman for X rays, and Dr. J. Lait for pathological reports.

BRITISH MEDICAL ASSOCIATION.

ANNUAL MEETING AT NOTTINGHAM.

(*Continued from p. 551.*)

SECTION OF DISEASES OF CHILDREN.

WEDNESDAY, JULY 21ST.

Dr. HUGH THURSFIELD, the President, in opening the business of this Section, referred to the great loss sustained by pædiatricians in the death of Dr. John Thomson, who had probably contributed more than any other to the advancement of the study of disease in childhood during the last 25 years.

ACUTE NEPHRITIS IN CHILDHOOD.

Dr. L. G. PARSONS (Birmingham), in opening this discussion, said that an analysis of a series of cases of acute nephritis showed that advice was usually sought because the child was passing bloody urine or because he was puffy or swollen. These two types of onset were associated with a series of symptoms and a clinical course which served to differentiate the cases into two groups. The cases in the hæmorrhagic group tended to recovery, whereas in the œdematous group the tendency to pass on to a chronic nephritis was more marked. Mixed cases showing a combination of symptoms of the two types also occurred, and, finally, there were cases which in the course of an illness, such as diphtheria, scarlet fever, pneumonia, showed symptoms which placed them in one of the foregoing groups or an examination of the urine revealed albuminuria with or without casts. The occurrence of defective excretion of threshold bodies in the œdematous or hydræmic group suggested that in these cases the tubular defect was the important one, and that in the absence of œdema any damage to the tubule was only slight. The pathological classification and description of acute nephritis given by Shaw Dunn was a good one, and could be used as a basis for a clinical classification. Febrile albuminuria constituted the mildest form of acute nephritis, and might represent either a transient glomerular nephritis or transient tubular nephritis.

The explanation of cases of chronic nephritis which arise insidiously, and of the failure to clear up what was apparently the first attack of a frank acute tubular nephritis was, said Dr. Parsons, not improbably to be found in the occurrence of a febrile albuminuria in a previous acute pyrexial illness. Nitrogen retention raised blood pressure, and uræmic fits were stated by some writers to be characteristic of the hæmorrhagic, by others of the tubular variety of acute nephritis. Both observations were correct, and their occurrence depended on the severity of the case, although the explanation was not the same in each group. In the hæmorrhagic cases the symptoms only occurred if there were oliguria. The oliguria was probably due to a mechanical retention of water from swelling of the glomerular tuft, and as a result of this urea was also retained. When the swelling became slightly less the "head" of urea in the blood produced a diuresis. This "critical diuresis" was of most favourable prognostic importance. Shaw Dunn and Jones had shown that in experimental tubular nephritis urea retention and oliguria occurred. This was due to the fact that tubular necrosis was produced, and the dead cells allowed the fluid in the tubules to diffuse back into the more dilute and changing tissue fluids in the supporting structures. Blackfan and Hamilton found that a steady rise in blood pressure was the most reliable sign of approaching uræmia; in their opinion raised intracranial tension resulting from œdema of the brain was the causative factor in producing uræmic symptoms, and the raised intracranial pressure was the cause of the raised blood pressure. Marriott maintained that nephritis was only part of a general disease, and due in the glomerular form to streptococcal, in the parenchymatous form to staphylococcal infections. The streptococcal infection was usually of the tonsils, the staphylococcal of the nasal sinus. It was quite clear that the exudative type of acute nephritis frequently appeared to arise without any obvious cause, whereas the hæmorrhagic was particularly associated with acute infections, especially tonsillitis, otitis media, &c., and an important group with septic rashes.

In the treatment of acute nephritis Dr. Parsons laid down three essentials: (1) rest, (2) a suitable dietary, and (3) the removal of any focus of sepsis. The patient should be confined to bed for at least three months, for rest of the body was as important in acute nephritis as in rheumatic heart disease. Although excretion of protein end-products entailed little effort on the part of the kidney, and "renal rest" could not be produced by starvation, yet he (the speaker) could not accept the view that limitation of protein in the diet was unnecessary. The diet should consist of milk or junket, with sugar and fruit juice as flavouring agents, for six to eight weeks. Attempts to relieve the kidney by increasing the elimination of fluids by the skin and by the bowel were of little value, diuretics were probably harmful and should not be used, and in the treatment of acute nephritis drugs generally had no place.

Dr. J. M. SMELLIE (Birmingham) thought that until a much closer correlation between the clinical picture and the true histology of the morbid process was possible, such a classification as that suggested by the opener should not be considered final. Clinically, there was no doubt that a large number of cases could be divided into two groups: (*a*) the hydræmic, œdematous, or exudative; and (*b*) the hæmorrhagic, but many mixed forms were encountered. He did not like the term "parenchymatous," since it suggested that parenchymatous changes in the hæmorrhagic form were either of negligible extent or not present. The cases investigated fell into three groups: (*a*) early, (*b*) intermediate, (*c*) late. The early prognosis was judged on six cases examined 18 months to four years after an acute attack of nephritis. Only one of these revealed clinical and biological changes indicative of renal damage. The intermediate prognosis was based on a case observed over a period of six and a half years; when first seen he suffered from uræmic fits, five years later he had acute pyrexial illness (chorea) without any recurrence of kidney mischief, and is now apparently healthy, although the biological findings are abnormal. The remote prognosis was based on a review of 39 cases at an average period of 16 years after an attack of acute nephritis, and without exception all these to-day were symptomatically well. Four had passed through pregnancy, and only one of the four suffered from convulsions at the time of labour. Sixteen had been examined clinically and renal efficiency tests carried out. None of these had any of the urinary changes associated with a chronic nephritis. Six revealed evidence of disturbance of the cardiovascular system, but he asked if he were correct in assuming that this disturbance was consequent upon previous renal inflammation. He had not found the renal efficiency tests to be of the assistance anticipated. In the absence of symptoms or physical signs, positive biochemical results could not be taken as conclusive evidence of renal damage, but they called for a further scrutiny of the patient and a certain guard in the prognosis until the case had been observed for a longer period. The absence of chronic and subacute cases in his survey was striking. This could not mean that they had all died, but was due in his opinion to the fact that the cases reviewed were severe in type, and that chronic nephritis was much more likely to develop from a succession of mild attacks, often overlooked, than from a severe attack which had received adequate treatment. His investigations had led him to the opinion that the ultimate prognosis of acute nephritis entirely hinged on the treatment given. If the original disease received efficient treatment complete recovery would occur in a very high proportion of cases.

Dr. J. C. SPENCE (Newcastle) said that although he agreed that the hæmorrhagic form carried a good prognosis and the exudative form a bad prognosis,

yet so many cases which started as a hæmorrhagic went on into a chronic nephritis that he thought a classification of acute nephritis was not practicable. There were two forms of nephritis in infants under 12 months which Dr. Parsons had not mentioned, but which were of great importance. In the one there was a febrile illness occurring in a child, say 6 months old; this illness simulated a respiratory disorder, and the diagnosis was often bronchopneumonia, but there were no chest signs, and the examination of the urine showed a considerable degree of albuminuria and casts. The other form was a syphilitic nephritis, which was characterised by marked œdema. The diagnosis of the latter form was of great importance, because these cases were in his experience universally fatal. With regard to chemical tests, he agreed with many of the remarks made, but he considered that continued blood-urea observations were of the greatest importance in the prognosis of nephritis. As to the remarks made about a protein dietary, he would point out that a milk diet contained a considerable amount of protein; indeed, the protein in three pints of milk was equivalent to that contained in half a pound of beef-steak, but possibly there were other constituents of meat associated with the protein which were really more important than protein itself.

Dr. HUGH BARBER (Derby) said that 20 years ago cases of acute nephritis which were not due to scarlet fever were regarded as idiopathic, but more recent investigations had demonstrated the importance of focal sepsis in the throat, nose, ears, and teeth. The cases put down as idiopathic in origin became fewer, although with our present want of knowledge such a group was still necessary. There was not any evidence of epidemic nephritis in childhood. He would stress the importance of early diagnosis, since some cases of acute nephritis were somewhat insidious in onset, and it was possible for a child to be ill several days outside hospital before attention was called to the urine. Of the numerous complications there were two points which appeared to him to be worthy of emphasis. First, that pericarditis was fairly common and was insidious in onset, giving rise to little, if any, pain. Secondly, that persistent vomiting might be the only sign of uræmia. Renal efficiency tests were more interesting in prognosis during convalescence but were not sufficiently delicate to help very much, although the estimation of the blood-urea was a useful guide to diet in these cases which had progressed to an extreme degree of œdema, with much albumin in the urine, since in such cases a diet rich in protein gave the best results. Judged clinically, the prognosis was severe in proportion to the length of time the acute symptoms were present, and a diuresis was the first sign of improvement. The chief essential in treatment was absolute rest in bed and keeping the child warm between blankets. Mild diuretics might not do any harm, but neither excess of fluid to drink nor drugs of any sort were of much use. Convalescence should proceed very gradually. Children after an attack of acute nephritis should not be allowed to go about with thighs and legs uncovered, for there was no doubt that cold disposed towards a relapse when a lesion was or had been present.

Dr. H. T. ASHBY (Manchester) wished to draw attention to a line of treatment for chronic nephritis but seldom used at present—namely, decapsulation of the kidney. It was possible that a further trial of this procedure might prove of value, particularly in turning the scale in a case which was doing badly, because subsequent to decapsulation a marked diuresis occurred. It was doubtful how the results of decapsulation were brought about, but three theories had been advanced. First, that the depriving the kidney of its capsule and then bringing the cortex into contact with perinephritic tissue led to the promotion of new vessels which anastomosed with those of the kidney, and thus provided for the removal of inflammatory exudate and assisted in re-establishing the renal function. Secondly, that the effects were due to the relief of tension, but, as a matter of fact, tension was not always present. Thirdly, it had been suggested, and he thought it the correct view, that the mechanism of the production of the diuresis and the disappearance of the œdema was the same as in the process of wet cupping and that direct cupping was done to the kidney itself by decapsulating it. If this were true he wondered if simple incision of the kidney would not prove as effective as decapsulation.

The PRESIDENT remarked that he had been quite as much interested during the discussion in what had been omitted as in what had been included. Venesection for some centuries had been an almost universal mode of treatment of acute disease, but had gone out during the last generation, yet there could be no doubt that a timely venesection in acute oliguria of adults was of the greatest service and well worth considering in children. Decapsulation of the kidney in acute cases owed possibly its somewhat rare successes to that principle. Renal efficiency tests that morning appeared out of favour, either as a means of diagnosing types or as affording grounds for prognosis; he thought that the standard of such tests had been insufficiently established in children, either in normal health or in those suffering from diseases other than those of the kidney.

Dr. WILKIE SCOTT (Nottingham) thought that decapsulation of the kidneys should be done in very acute cases with suppression of urine, and particularly if the case appeared to be an acute attack engrafted upon a chronic nephritis. He also stressed the importance of slight, often overlooked, attacks of acute nephritis in infants.

Dr. N. C. CAPON (Liverpool) did not like the use of the word "nephrosis," because if this label were correctly employed it meant that the changes in the kidney were due to degeneration, and not to inflammation; such a condition must be an extremely rare one, because in all the hydræmic cases which he had examined there was always evidence of inflammatory changes. He thought that it was a mistake to limit the protein in the diet in hydræmic cases, because in them the protein content of the blood was much diminished. With regard to Dr. Parsons's suggestion that the tonsils should not be removed until the third month, he thought that if these were infected they should be removed at the earliest possible moment.

Dr. C. W. VINING (Leeds) emphasised the importance of rest in the treatment, and thought that it was most important that hospital accommodation should be available to give these patients prolonged rest.

Dr. H. CHODAK GREGORY (London) commented on the severe constipation occurring in some of these children, and had also noticed the association in early infancy of acute nephritis with septic rashes.

Dr. PARSONS, in reply, said that he agreed with Dr. Smellie in disliking the application of the term parenchymatous to the exudative group of acute nephritis, but that he had made use of the term because such cases had been labelled parenchymatous for many years and had received the sanction of antiquity. As to the term nephrosis, different authorities gave different definitions, but he agreed with Dr. Capon that there was rarely evidence of degeneration and usually evidence of inflammation. He (the speaker) also agreed that if there was evidence of infection of the tonsils they should be as a rule removed at the earliest possible moment, but he had on rare occasions seen an exacerbation of the kidney condition follow the operation, and therefore in his opening remarks he had "played for safety."

GOITRE IN CHILDHOOD.

A paper on this subject read by Dr. C. H. MILLIGAN (Glossop) gave the point of view of a whole time public health officer. The definition of goitre adopted in his inquiry was a visible enlargement of the thyroid. The incidence varied with age, sex, and locality. In a total of 1870 children examined, goitre occurred in 0·9 per cent. of those under 7 years of age, 8·4 per cent. in boys of 13, and 25·9 per cent. in girls of 13

years of age. In Essex, goitre, both in boys and girls, was almost unknown, whereas in one school at Wirksworth 57 per cent. of the girls and 50 per cent. of the boys were goitrous. He also found that the incidence of certain diseases varied in goitrous and non-goitrous children—thus 25 per cent. of goitrous children suffered from rheumatism, compared with 5·5 per cent. of the non-goitrous children. The types of goitre found were either the simple parenchymatous variety or the hyperplasia of puberty, but the types ran one into the other. Some of the cases showed hypo- and some hyper-thyroidism. There were no cases suffering from toxic adenoma or exophthalmic goitre. A scheme for the prevention of goitre had been started at Glossop; the children were given iodised sweets containing 5 to 10 mg. of iodine. Goitre in Derbyshire was a dying disease, and was disappearing in every district where a cleaner and better water-supply than formerly was obtained.

In discussing this paper Dr. L. A. PARRY (Brighton) thought that there must be some other explanation than locality for such a wide variation in incidence. He thought the personal factor of the examiner must account for much of the difference.

Dr. M. EDELSTEN POPE (New South Wales) said that a goitre survey of 75,000 country and 10,000 city children of 5 to 15 years of age had been conducted in New South Wales, and it was found that goitre was endemic in certain areas. Goitre was found in the hilly districts just off and on the edge of the tableland, whereas on the hot, dry plains and seaboards the children were free from goitre.

THURSDAY, JULY 22ND.

At a joint meeting with the Section of Orthopædics, when Mr. E. MUIRHEAD LITTLE (London) presided, a discussion on

SPASTIC PARALYSIS

was opened by Dr. W. J. ADIE (London), who said that he accepted the word "spastic" in the strict sense, and would confine his attention to those conditions in which stiffness and weakness of the muscles resulted from disease of the pyramidal system. The commonest, and therefore the most important of these, was the form of cerebral diplegia, generally known as Little's disease. According to many, injury to the brain at birth was the most important ætiological factor in Little's disease, but Dr. James Collier considered that the essential anatomical lesion was a primary degeneration of cerebral neurones, due to causes at present unknown. The remarkable researches upon the mechanism of birth injuries, and the pathological changes produced thereby, that were being carried out by Schwartz and his associates, demonstrated the great frequency of these injuries, and the decisive part they played in producing much infantile mortality which was at present attributed to other causes. This work proved that not only could gross changes occur, but that atrophic sclerosis might result from injury to the brain sustained at birth. Dr. Adie himself had called attention to the remarkable group of symptoms presented by men who had sustained gun-shot wounds of the vertex, with injury to the superior longitudinal sinus, producing a transitory clinical picture of Little's disease in its purest form. There were two other features of ordinary diplegia which he found difficult to reconcile with the notion of a primary neuronic degeneration as the essential anatomical cause: (1) that the disease was not a familial one, and (2) that practically all the conditions in which primary neuronic degeneration was generally accepted as the anatomical cause, the course of the disease was progressive to death, or up to a point peculiar to the disease, or to the affected family, whereas the tendency to improve was highly characteristic of ordinary non-familial diplegia. For practical purposes it mattered little whether the damage was pre- or intra-natal. The important fact was that diplegia from birth tended to improve, and much could be done in these cases by appropriate surgical treatment. The cases must, however, be carefully chosen. Gross mental defect was a contra-indication, but where this was moderate an operation which would enable the child to move about might bring about an improvement in the mental condition. Diplegia and epilepsy was an unfavourable combination, and if the fits were not easily controlled by appropriate remedies the surgeon should hesitate before operating on the limbs, as the prognosis for the mental condition was bad. Operation was hardly worth while when involuntary movements were the unfavourable symptoms.

After describing some forms of familial diplegia, such as amaurotic family idiocy, the Merzbacher-Pelizaeus "disease" and the hereditary form of spastic spinal paralysis, Dr. Adie went on to deal with the neurological problems presented by spastic paralysis. He said that recent studies on decerebrate rigidity had added greatly to the knowledge of muscle tone, but so far they had given no clear indication for new methods of treatment. The disturbance of tone and the reflex phenomena of spastic paralysis in man were identical, as Walshe had pointed out, with the tonic and phasic reactions in decerebrate animals. It might well be that sympathetic nerve-fibres reached striped muscle-fibres and exerted an important trophic influence upon them, but the evidence available at present did not support the notion that the sympathetic played any part in the regulation of muscle tone. Gaskell showed long ago that the sympathetic nervous system was not a separate nervous system, interchanging fibres with the cerebro-spinal system, but was formed by fibres given off from the cord. Langley made it clear that the autonomic system of which the sympathetic is a part, though capable to a certain degree of independent action, functioned under the control of higher centres. These higher centres, from which he believed all impulses passed that reached the sympathetic, were situated at a level cephalad to the point of election for the section producing decerebrate rigidity, and if his assumption were correct, sympathetic impulses to the muscles, if they existed, were cut off by the very section which produced decerebrate rigidity. It was certain that complete ablation of the sympathetic system had no effect on decerebrate rigidity, and hence the division of sympathetic fibres were not likely to influence spasticity. He hoped that surgeons who had performed sympathectomy in spastic states would communicate their results during the discussion.

Mr. BLUNDELL BANKART (London) said that spastic paralysis was not a disease, but a physiological state—the natural physiological result of the anatomical condition present in any given state. It closely resembled, if it was not identical with, the condition known as decerebrate rigidity, which was produced experimentally by section of the brain above the level of the mid-brain. The treatment of spastic paralysis was operative. It was true that considerable improvement might sometimes be effected in spastic individuals by systematic training, or re-education of movements, but apart from that non-operative treatment was useless, and he had never yet seen any permanent benefit result from massage, manipulations, or electrical stimulation. Moreover, in the majority of cases the place of re-education was after operation and not before it. When structural shortening existed, it had to be treated by a direct attack on the shortened muscles or their tendons. But when dealing with pure physiological contracture there was a choice of methods. It was hardly necessary to discuss Foerster's operation of posterior root section, since it had been universally abandoned as a method of treating spastic paralysis. It was, however, necessary to say something about the operation of sympathetic ramisectomy, which had been recently introduced by Hunter and Royle, and had now been given a fair trial. The operation was based upon the hypothesis that the functions of movements and posture were performed by entirely different sets of muscle-fibres, and that the movement fibres were supplied by the ordinary spinal nerves

and the postural fibres by the sympathetic. Spastic paralysis was a state of exaggerated postural activity, and it was thought that destruction of the grey rami of the sympathetic would cure, or greatly diminish, the spasticity of the corresponding muscles, but the claims put forward for this operation had not been substantiated. As to the view that the sympathetic was specially concerned with the postural activity of skeletal muscle, the histological evidence was negative and disputed; the conclusions drawn by Hunter and Royle, from experiments on animals, had been severely criticised by neurologists, but what perhaps was of the greatest importance was the fact that in the hands of others the operation of sympathetic ramisectomy had not given results at all approaching those claimed by Royle. For many years orthopædic surgeons had treated spastic contractures locally by operation upon the contracted muscles or their nerves, and he emphasised the point that whether one attacked the muscles or the nerves, the principle of the operation was the same—namely, to diminish the effective action of a muscle either by lengthening it, so that its effective range of action was less, or by destroying part of it, so that its strength of contraction was less. Good results had been obtained by both methods. He thought that operations on the peripheral nerves, known as Stöffel's operations, had some advantages over those on muscles and tendons. The correction of typical deformities of spastic paralysis by muscle and tendon operations entailed a long course of treatment, the details of which were, of course, well known. It was necessary to keep the limbs for some time in some form of apparatus, and to prevent relapse many surgeons had found it necessary to put these cases into walking instruments for a long time after the correction of their deformities. Now the principle of Stöffel's operation on the peripheral nerves was this. In spastic contracture there was a powerful group of muscles in a state of tonic contracture, so intense that it held the part in a position of deformity, and prevented movements in any direction. Destruction of a sufficient part of this muscle group abolished the excessive contracture and got rid of the contracture deformity, whilst leaving sufficient muscular power for all practical purposes. The simplest way of destroying muscle-fibres was to cut out their nerve-supply, and Stöffel's operation consisted in finding the nerve tracts, usually before they left the main nerve, and excising a sufficient portion of them. In each case the relief of the contracture was immediate and permanent. This statement had been criticised, and he would therefore like to add that he had seen recurrence of deformity after Stöffel's operation on the internal popliteal nerve, but he did not blame the operation for this, but rather himself, for the recurrence was due either to faulty judgment or to faulty technique. In conclusion he would submit that Stöffel's operation was the best method of treatment which had yet been devised for the relief of spastic contracture. The actual operation in each region was quite a minor operation and easy of performance, and it admitted of a degree of precision and adjustment to the needs of individual cases, such as could not be obtained in any other way. The very nature of the resulting intentional paralysis made recurrence of the contractures impossible, and therefore prolonged after-treatment, and the use of splints or other apparatus was unnecessary.

Dr. JOHN BEATTIE (London) said that those who engaged in carrying out animal experimental work on the sympathetic agreed that Royle's operation as described by Hunter was a complete failure in man. Dr. Adie's statements that the evidence available at present does not support the notion that sympathetic plays any part in the regulation of muscle tone, and that sympathetic impulses to the muscles, if these exist, are cut off by the very section that produces decerebral rigidity, were incorrect. In attempting to apply to man the results obtained from experiments on animals, care was necessary because the problem of muscle tone was a different one in man and in animals. Moll, however, in trying the effect of nicotine on the constitution of post-encephalitic Parkinsonism, had recorded a series of facts which showed that the sympathetic in man had some effect in increasing muscle tone. Dr. Beattie then showed a series of most interesting cinematograph films illustrating the effects of sympathectomy on seagulls, fowls, non-decerebrate and decerebrate goats.

Mr. S. W. DAW (Leeds) said that he rarely saw progressive cases. He had employed Stöffel's operation in a large number of cases, and the results on the whole were very satisfactory. This operation was very much superior to operations on tendons because of the tedious and often painful after-treatment necessary in the latter operations. Fourteen days after Stöffel's operation the child could begin to walk and start re-education exercises. If contraction were present a combination of the two methods, Stöffel's operation and tendon lengthening, was useful. In the lower limbs lengthening of the muscle was, however, preferable to lengthening the tendon. A mild degree of athetosis was not a contra-indication to operation.

Mr. NAUGHTON DUNN (Birmingham) said that there were three difficulties in the treatment of spastic diplegia: (1) the mental condition of the child, (2) the increased tone, and (3) the weakness and diminished voluntary control of the muscles. He made it a rule that no operation should be done unless the child had shown either naturally, or after training, some attempt to use the limbs. Re-education after operation was of the greatest importance. With regard to the question of muscle or tendon lengthening, his practice was to do a muscle lengthening operation where the muscle was a fleshy one, but where the muscle had a direct tendinous insertion tendon lengthening was preferable.

In the opinion of Mr. H. A. T. FAIRBANK (London) the deformities largely depended on the action of gravity and the advantage that certain groups of muscles have over their antagonistic muscles. He would ask Dr. Adie if he knew of any drugs which had any effect on the involuntary movements, particularly on the "jumpiness" seen in some cases. Gross involuntary movements were certainly a contra-indication to operation, but in certain cases operation seemed to improve involuntary movements. The right age for operation was about three years, because when the child had reached that age the surgeon had a better idea of what it was necessary to do. He asked why it was that some children developed anatomical shortening of the affected muscles early, and others much later on in life, and he would also like to know how much nerve-fibre must be exsected to prevent regeneration in Stöffel's operation, because in three instances he had known regeneration occur after exsection of one inch of nerve.

Dr. NEILL HOBHOUSE (London) admitted that Dr. Adie had made out a good case for birth injury being the causal factor in infantile hemiplegia and spastic diplegia. If these cases were seen in infancy and early childhood a great deal of spasticity could be prevented, and there was a wide field for non-operative treatment in hemiplegia and in a considerable number of cases of diplegia. In any child where new reflexes could be conditioned new voluntary movements could be developed, and why, therefore, could not inhibition of these movements also be developed. Faradisation of spastic muscles was irrational and was the cause of a great many of the severe contractures seen. A severe degree of spasticity rarely occurred in any case which he had had under observation from infancy. In hemiplegia the very best treatment was to tie up the sound arm and so make the child use the hemiplegic one.

Dr. W. F. MENZIES (Leek) said that as one of these children, the subject of spastic diplegia, grew up, first there was no spasticity and it was able to perform movements, but later the limbs became rigid, and later still there were contractures. The faster the child went down hill the earlier rigidity and spasticity developed, and the more could it be inferred that

the cerebral cortex was involved. If these children were treated and taught to walk, the onset of the symptoms of spasticity occurred at about three years of age, but if they were left untreated spasticity did not occur until 15 or 16 years of age.

Mr. A. ROCYN-JONES (London) pointed out that operation not only benefited the physical condition of the patients, but it also benefited their mental condition. Stöffel's operation was the ideal treatment, but in some cases a combination of this operation with muscle and tendon lengthening was necessary. Adductor spasm was likely to recur after Stöffel's operation, and he therefore always cut the adductor longus in addition to removal of part of the nerve.

Mr. A. H. TODD (London) said that in the treatment of upper limb defects the enthusiasm of the parents was often a determining factor. It was important to get the child to use both hands, and treatment in such cases could be summed up in the phrase—a keen mother and a wheel-barrow.

Dr. N. B. CAPON (Liverpool) said that he spoke from the point of view of the children's physician. Since cerebral diplegia was almost certainly due to birth trauma, the right line of treatment for spastic diplegia was to treat it before the spasticity developed —i.e., when the baby was 1 to 2 days old. The lesion produced by the birth injury was not a meningeal hæmorrhage (except in cases where death occurred), but was due to œdema, congestion, and subtentorial hæmorrhage, and for relief of the condition repeated lumbar punctures were necessary and efficacious. If lumbar puncture was not done, the results found were those described by Schwartz, to which Dr. Adie had referred.

Dr. ADIE, in reply, said that Schwartz's work had shown that even alleged congenital defects of the brain were the results of birth injury. There was no drug which had any beneficial influence on spasticity, but for the general "jumpiness" described by Mr. Fairbank he would recommend bromides.

Mr. BANKART, replying, said that with regard to the question of nerve or muscle section there was much to be said on both sides. In view of the experimental results shown on the screen by Dr. Beattie he would like to ask him why ramisectomy had failed in the human subject?

SECTION OF ORTHOPÆDICS.

FRIDAY, JULY 23RD.

THE first meeting of this Section combined with the Section of Diseases of Children to discuss Spastic Paralysis, and has been reported under that section. On the second day, Mr. E. MUIRHEAD LITTLE presiding, a discussion on

NON-TUBERCULOUS COXITIS IN THE YOUNG

was opened by Mr. H. A. T. FAIRBANK, who referred to an admirable paper by Mr. Alan Todd, read at the Orthopædic Section of the Royal Society of Medicine. He would endeavour to cover the same ground. Coxitis might arise from trauma or infection, and he suggested as a basis of discussion the following classification: (1) Traumatic synovitis and arthritis; (2) traumatic synovitis and arthritis with adolescent coxa vara; (3) infective arthritis—acute, subacute, and chronic (subsection: arthritis secondary to osteomyelitis); (4) acute rheumatic arthritis; (5) rheumatoid arthritis (Still's disease); (6) pseudo-coxalgia; (7) coxitis complicating congenital dislocation of the hip—(*a*) villous, (*b*) absorptive, (*c*) osteo-arthritic; (8) arthritis deformans juvenilis. This differed somewhat from Mr. Todd's classification. "Coxitis of secondary onset" had been left out, inasmuch as all cases, including the tuberculous, were secondary to other lesions. Infective arthritis depended on the organism producing it and the virulence of this organism, not on its source. Taking these groups seriatim, Group (1), said Mr. Fairbank, recovered with rest without immobilisation. Some of his recent cases had shown a separate piece of bone in the acetabular margin, possibly a sesamoid in the reflected head of the rectus. Did this condition, he asked, predispose to joint strain? Group (2): Epiphyseal strain was the first stage of adolescent coxa vara; shortening and displacement were always present. This was a very important group, for cases with gross displacement and much spasm were often mistaken for tubercle. Group (3): All types of arthritis might be caused by the same organism of varying virulence, especially staphylococci, even in the same patient. If the arthritis was suppurative and arthrotomy became necessary, perfect drainage was essential. The subacute type in which the pneumococcus might be suspected, was to be treated by irrigation and closure of the wound. After acute arthritis, abduction must be maintained at least three months to avoid dislocation. Difficulties of diagnosis and treatment occurred in acute osteomyelitis of the femur with secondary arthritis. Subacute and chronic cases of arthritis with negative X ray finding required immobilisation and extension, with the skiagram repeated after a month, and again if necessary after further fixation. There was no special form of arthritis associated with measles. In scarlet fever, all grades of arthritis up to suppuration were met with, due probably to toxins or actual infection with streptococci of varying virulence. Enucleation of tonsils should not give rise to secondary arthritis if properly performed, but if infective remnants were left, arthritis might follow at any subsequent time. Group (6): Tubercle might simulate pseudo-coxalgia. Two clinical stages of the latter required differentiation: without general spasm—from pre-arthritic tubercle of femur or acetabulum; with general spasm—from tuberculous arthritis. Group (7): The traumatic arthritis which occurred after reduction of a dislocated hip was possibly infective. Pain in untreated cases was due to arthritis and not to mere static conditions—which had an important bearing on treatment. Was villous arthritis possibly the cause of pain when X rays failed to reveal gross changes in the head of the femur? Absorptive arthritis might occur as a late result of reduction in older children, successful or unsuccessful. Osteo-arthritis occurred chiefly in subluxated hips, undiagnosed until the onset of arthritis. Group (8): The juvenile form was very rare as a primary affection. It was, as a rule, preceded by anatomical abnormality resulting from congenital defect, trauma, or infection.

Mr. S. W. DAW (Leeds) thought Mr. Fairbank's classification a good one, but he would leave out arthritis deformans juvenilis as he was not satisfied that it existed as a separate primary entity. He often came across cases which it was difficult to fit into any of the recognised groups. With Mr. Fairbank he would leave these unclassified until we were more certain of their status, and he suggested that arthritis deformans juvenilis should remain in this category. As to rheumatoid arthritis (Still's disease), he would like to say something about the difficulties of diagnosis in the earlier stages. Many years ago a case diagnosed by a colleague and himself as tuberculous was treated by immobilisation. A year or two later she appeared as an out-patient with arthritis of both knees and hips. He then changed the diagnosis to rheumatism and allowed exercise. She was now walking very badly with much limitation of movement in all the joints. In another case, diagnosed and treated as lumbar, Pott's disease appeared a year later with arthritis of practically every joint in the body, including the small joints of the hands. After getting scarlet fever his joints cleared up astonishingly, but he had a dislocation of one hip as a result of scarlatinal arthritis. He thought that these cases illustrated the fact that the development of multiple joint lesions might be slow. The differentiation of pseudo-coxalgia from tuberculosis might be difficult, but he believed that in the former it was nearly always the case that the X ray appearance was in advance of the clinical symptoms, while the reverse obtained in tuberculosis. As to congenital dislocation of the

hip, he was sure that it was quite true that many patients go on for a long time with very little pain. He knew of a woman of 40 with unilateral dislocation, who rode and played a good game of tennis.

Mr. S. T. IRWIN (Belfast), referring to displacement of the head of the femur, said that up to the age of about 11 years the epiphyseal cartilage of the head was continuous by a bar of cartilage with the cartilaginous neck and that this prevented slipping of the epiphysis, which was rare under that age. He showed some excellent demineralised specimens and others illustrating this detail in the development of the femur, and a number of lantern slides of cases of displacement of the epiphysis and of arthritis from various causes.

Mr. T. P. MCMURRAY (Liverpool) preferred a simpler classification than that of Mr. Fairbank. He would divide cases into tuberculous and non-tuberculous and subdivide the second category into traumatic and infective. This classification would not include pseudo-coxalgia. He thought that sesamoid bones in the neighbourhood of the hip-joint did not predispose to arthritis.

Mr. HARRY PLATT (Manchester) referred to the diagnostic value of information concerning the comparative incidence of the various types of chronic hip disease, and particularly to the age of onset. Broadly speaking, a chronic hip lesion in a child under 5 years of age was likely to be tuberculous arthritis; between the ages of 5 and 10 pseudo-coxalgia was at least as common as tuberculous arthritis. In the second decade tuberculous arthritis was found to be a comparatively rare lesion, the characteristic hip lesion of this age being traumatic coxa vara. At all age-periods a transitory synovitis due to trauma or infection might occur. It must be recognised that the symptoms of "mild hip disease" were seen in the early stages of both the tuberculous and non-tuberculous lesions. Tuberculous arthritis proper could be diagnosed with ease in the florid phase, but considerable difficulty was experienced in the extra-articular forms of tuberculous coxitis. An early confirmatory sign of primary disease of the acetabulum was enlargement of the iliac glands. The importance of this sign did not seem to be appreciated widely. Occasionally the clinical course of tuberculous coxitis was comparable to the better-known "dry arthritis" of the shoulder-joint. In such cases destructive changes developed after a long latent period, during which there might be an apparent complete remission of symptoms. Pseudo-coxalgia with its typical radiographic picture usually offered little difficulty in diagnosis. Chronic infective synovitis and arthritis, arising de novo in children, was a rare affection, but in hip-joints already defective, as, for example, in the milder degrees of congenital subluxation, secondary arthritic changes were often seen. In the adolescent arthritis deformans juvenilis showed quite a typical clinical and radiographic picture, but was unlikely to be a true primary coxitis. At this age-period a "dry arthritis" of non-tuberculous origin seemed to exist as a definite entity, but it must be admitted that the final pathological proof was often wanting.

Mr. ALAN H. TODD (London) advocated elaborate classification clinically, so as to find out what were the varieties and perhaps finally to simplify the classification. He believed that juxta-epiphyseal strain was a real stage of coxa vara. He had experience of sesamoid bones of the hip and other occasional opacities about the upper rim of the acetabulum in X ray pictures without any symptoms. He spoke of the possibility of gonorrhœal arthritis in small children such as had been observed in hospital after an epidemic of vulvo-vaginitis. In the differential diagnosis of tuberculous and non-tuberculous hips, he thought that the suggestion made by Dr. Knyvett Gordon of a histological examination of the blood for leucopenia and other abnormalities might give useful information, and he put in a plea for a collective investigation of this method. Doubtful cases should be treated tentatively. Although some cases of unreduced congenital dislocation of the hip might not suffer grave inconvenience in after years, many others did, and it was most important to impress upon the profession the importance of earlier diagnosis and treatment than was now the rule.

Mr. F. C. PYBUS (Newcastle-on-Tyne), referring to Mr. Irwin's specimens of femurs, said that the cartilaginous head was freely vascularised before ossification and thus primary vascular infection of the hip might occur. Rollier, at Leysin, allowed some movement in tuberculous joints, and he thought that we might also do so. In pseudo-coxalgia the X ray appearances might either precede or succeed the clinical symptoms. Coxa plana might occur in this disease. He doubted if arthritis deformans juvenilis was a clinical entity. In tuberculosis of the neck of the femur early operation and removal of the focus and drainage might prevent involution of the joint.

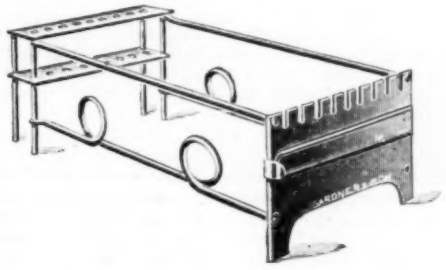
Mr. W. A. COCHRANE (Edinburgh) said that an additional fact of interest in regard to displacement of epiphysis was the variation of angle of the epiphyseal line with the axis of the neck of the femur. He thought that the nearer this line approached the vertical the more likely was the epiphysis to slip. Was there any relationship between slight and neglected epiphyseal separation and the later development of coxa vara?

In a brief reply Mr. FAIRBANK said that in juxta-epiphyseal strains there was always slight displacement of the epiphysis. Acutely infected joints should be opened and freely drained without tubes.

New Inventions.

AN OPERATIVE RADIUM-NEEDLE STAND.

THE stand here illustrated is designed to facilitate the radium surgeon in operations of access and insertion. The illustration shows the stand with radium needles and tubes in position, together with their attached threads and identification beads. Sterilisation may be effected by boiling the stand with the needles, &c., in situ, or the needles and tubes may be sterilised separately in spirit and then placed



in position. If using the former method, the threads are anchored by means of a metal band with aseptic hinge which secures them against the end of the apparatus, while the radium tubes remain safely in test-tubes passed through the wire loops provided on the lower horizontal support of the frame. At operation the band is swung back to liberate the threads and the stand is placed on a table close to the operator ready for use.

We are indebted to Messrs. J. Gardner and Son, 32, Forrest-road, Edinburgh, for making the stand for us.

ARTHUR B. SMITH, M.B., F.R.C.S. Edin.
SYDNEY M. SMITH, M.B., Ch.B. Edin.
London, W.

Reviews and Notices of Books.

INTERNAL SECRETION OF THE PANCREAS AND INSULIN.

La Sécrétion Interne du Pancréas et l'Insuline. By Dr. ANDRÉ CHOAY. Paris: Masson et Cie. 1926. Pp. 570. 8*s.* 4*d.*

THIS volume is an exhaustive summary of the literature upon the internal secretion of the pancreas. It begins with an historical review which contains a good summary of the researches of K. Brunner, instead of the usual cursory reference to this worker. Dr. Choay describes how Brunner in 1688 removed the pancreas from dogs and noted the increased appetite, thirst, and wasting which followed. The author points out that Brunner cannot have succeeded in removing the entire pancreas, since the diabetes following the operation was not fatal. Indeed, Brunner's own accounts of the post-mortem examinations of his animals showed that part of the gland had been left. A tribute is also paid to the work of Cawley, an English physician who isolated sugar from the urine and noticed the presence of a pancreatic lesion as early as 1788. It is clear that the author has not merely accepted the historical records of other workers, but has himself investigated the literature. Dr. Choay describes in detail the various methods of performing pancreatectomy on suitable laboratory animals, and gives a careful account of the clinical history of depancreatised animals together with some deductions made from a study of their metabolism.

The second chapter is devoted to histology and the third to a review of the various attempts to demonstrate the internal secretion of the pancreas in the different efferent pancreatic vessels. Here the perfusion experiments of the earlier workers are described at great length. Chapter IV. is concerned with researches on the preparation of an active pancreatic extract, and the different methods for the manufacture of insulin and its purification and chemical properties are discussed. The pharmacological action of insulin is fully and clearly described and two excellent figures show rabbits in typical hypoglycæmic attitudes. The chapter upon therapeutic use is brief but sets out the principles of the various methods for the use of insulin and the treatment of diabetes. The origin and distribution of insulin and the theories of its mode of action are discussed at length.

The volume, which closes with a list of 1377 references, is an exhaustive and well-illustrated summary of the work done upon insulin up to the date of publication, and will be of the greatest value to biochemists and physicians.

THE SURGERY OF GASTRO-DUODENAL ULCERATION.

By CHARLES A. PANNETT, B.Sc., M.D. Lond., F.R.C.S. Eng., Professor of Surgery in the University of London; Surgeon to St. Mary's Hospital. London: Humphrey Milford. Oxford Medical Publications. 1926. Pp. 154. 10*s.* 6*d.*

IN the compass of a small handbook Prof. Pannett has succeeded in presenting the modern views regarding gastro-duodenal ulceration in an attractive manner. After a brief discussion on the pathology and symptomatology of the disease he devotes two-thirds of his space to treatment. He presents clearly and fairly the views held by other surgeons, especially when they conflict with his own views. These are well presented, backed by cogent argument and by illustrations drawn from a considerable experience. The result is a decisive outlook often lacking in larger monographs. He is strongly in favour of the excision of all gastric ulcers, whenever this is feasible, reserving simple gastro-jejunostomy for those cases where the extent of the ulcer or of the adhesions renders excision too severe a procedure. In ulcers at a distance from the pylorus he prefers sleeve resection, holding that the usual operation of partial gastrectomy sacrifices too much of the stomach wall. For ulcers of the duodenum he is an ardent advocate of partial duodenectomy, considering that the results amply justify the added risks of the operation. The book is illustrated largely by the author, and his surgical colleagues will envy his powers as a draughtsman. For example, in the pages devoted to technique, the details of such a complicated operation as a Péan resection can be grasped in an instant from the author's sketches. Each chapter concludes with a full bibliography. The book should appeal to a wide audience, for though it is written essentially for the operating surgeon, its pages will be of interest to the general practitioner who wishes to understand the trend of modern gastric surgery.

We congratulate the author on the production of a monograph at once readable and complete.

ATLAS OF MIDWIFERY.

By COMYNS BERKELEY, M.A., M.C., M.D. Camb., F.R.C.P. Lond., M.R.C.S. Eng., Senior Obstetric and Gynæcological Surgeon to the Middlesex Hospital; and GEORGE M. DUPUY, M.D. London: Baillière, Tindall and Cox. 1926. Pp. 160. 7*s.* 6*d.*

THIS book consists of 250 illustrations and eight radiographs with rather extensive legends, but is without any text properly so-called. The legends throughout are excellent, and the fact that such an experienced teacher as Mr. Comyns Berkeley is one of the joint authors is sufficient guarantee that the teaching, as far as it goes, is up to date, sound, and accurate. For students whose memory is of the visual type this book would be a useful addition to a cram book when revision for examinations is being undertaken. This we suppose is the purpose the book is designed to serve, for the ordinary student's text-book contains more figures than are found here, and although some subjects which particularly lend themselves to this method of explanation are well treated, most of the illustrations are neither better nor worse than those commonly found in text-books. Many of the drawings appear to be worthy of better printing, and some, the Fœtal Circulation, for example, really need colour printing to make them intelligible.

HEREDITY.

Fifth edition. By J. ARTHUR THOMSON, Regius Professor of Natural History in the University of Aberdeen. London: John Murray. 1926. With 44 figures. Pp. 542. 21*s.*

A GREAT many books are published nowadays about heredity and in many ways this is one of the best. Most of the recent works are really more about mendelism, and they lack the general historical background which Prof. Thomson gives so well. His book was first published in 1908 and, we think wisely, he has left large parts of it unaltered. We can thus appreciate what the problems looked like nearly 20 years ago and realise that many of them look much the same to-day. The rediscovery of Mendel's work has led to one of the most fruitful of biological revolutions, but it has yet to be proved—which some enthusiasts for the growing edge of natural knowledge are apt to forget—that what he found out is the whole explanation of inheritance. Those who have revelled in books like Prof. T. H. Morgan's Theory of the Gene will probably think Prof. Thomson rather old fashioned and not so sure of the reasons of things as he should be. There is, it is true, a good deal of work of importance that he does not notice—the books of Crew and Goldschmidt, for example, are mentioned in the bibliography, but not much use seems to be made of their contents in the text—but he includes much which is now often omitted, and his book forms an excellent complement to the very latest publication. It is unnecessary to say that it is easy to read and understand. We could wish that the author and the

publisher's reader had been more careful about the details of the revision. The bibliography of papers with its subject index has disappeared, but it is still mentioned in the preface dated 1926; the diagram of ancestral inheritance no longer appears "on the opposite page" (p. 325) but on the following page; Kammerer's book is dated "New York, 1924," in the text (p. 211) and "Boston, 1925," in the bibliography (p. 533).

THE CRYSTALLINE LENS.

Sémiologie Oculaire: Le Cristallin et son Appareil Suspenseur. By FELIX TERRIEN, Professor in the Faculty of Medicine in Paris. Paris: Masson et Cie. 1926. With 158 figures. Pp. 240. 6*s*.

THIS volume, which deals with the anatomy, physiology, and pathology of the crystalline lens, is a section of a work planned on a large scale to include the whole of ophthalmology. The embryology and development of the lens are first discussed, adequately enough, on familiar lines. The anatomical section which follows is well illustrated. One of the diagrams clearly displays the variations in the thickness of the lens capsule on its anterior surface, which variations, according to modern views, are an important factor in the mechanism of accommodation. The theory of Helmholtz, which ascribes the increase in the curvature of the anterior surface of the lens during accommodation to the relaxation of the zonular fibres, still holds, having recently received support from the work of E. F. Fincham. Tscherning's theory has now but few adherents, while that recently put forward by Lindsay Johnson, who ascribes the alteration in the curvature of the lens to the hydraulic pressure of the aqueous, is firmly rejected by Prof. Terrien. The second and smaller half of this volume is devoted to the various forms of cataract and dislocated lens. Operative treatment is reserved for another volume, and the author here merely indicates his preferences for conservative methods of extraction, preferably combined extraction with a conjunctival bridge and a small peripheral iridectomy. We should have welcomed a somewhat fuller treatment of the subject of congenital cataract; apart from the anterior polar and lamellar forms there is little more than a page allotted to this condition. Total congenital cataract is one of the most difficult subjects with which the ophthalmic surgeon is called upon to deal, and the prognosis after operation is always doubtful. A considerable percentage of the inmates of blind schools are children who have been operated on in early childhood for cataract with unsatisfactory results, being left with nystagmus and the remains of lens capsules in both eyes.

Possibly the author will find opportunity to deal more exhaustively with the treatment of congenital cataract when he comes to discuss operative measures.

DISEASES OF THE EAR.

Politzer's Text-book on the Diseases of the Ear. For Students and Practitioners. Sixth edition. Revised and largely rewritten by MILTON J. BALLIN, M.D., Ph.B., Attending Oto-Rhino-Laryngologist, Bronx Hospital, New York. London: Baillière, Tindall and Cox. 1926. Pp. 776. 31*s*. 6*d*.

Adam Politzer was an outstanding figure in otology through the second half of the last century; he published his method of inflation of the tympanum in 1863. His text-book of diseases of the ear has been through many editions in many languages; it excels especially in the careful detail of the description of the examination and treatment of the commoner forms of ear disease, the inflammations of the middle ear, and the varieties of middle-ear deafness. Suppuration of the middle ear, for instance, shows great variety in its course and in the pathological appearances which it produces; Politzer's minute account of the details of its treatment are most useful, not only to the practitioner, but to the otologist.

But otology has advanced considerably in some directions in the last 20 years; Politzer's is now an old book and, unfortunately, Dr. Ballin has not revised this new edition with sufficient care to bring it up to date. Even a cursory examination of the references to authorities given in footnotes makes this evident; few, indeed, of these references are less than 20 years old, certain "recent investigations" mentioned in the text carry a reference to a paper published in 1902, and many papers are dated from the last century. The difficulty in determining whether we are reading what Politzer wrote many years ago or an addition made by the translator further detracts from the book. As to the later developments in otology, the description of nystagmus produced by caloric stimuli and by rotation is not clear enough to be of use in a clinical examination of the labyrinth; the same criticism must be applied to the account of the pathological changes in the cerebro-spinal fluid obtained by lumbar puncture; and it is odd to read even a short description of the static function of the vestibule without a reference to the work of Magnus and de Kleijn. On the other hand, operations devised during last century for the improvement of cases of "adhesive" middle-ear catarrh, such as artificial perforation of the drum, division of the posterior fold, and tenotomy of the intratympanic muscles, are discussed at considerable length though they have long been abandoned. The attempt to modernise this once excellent and authoritative work has not been successful.

TREATMENT OF THE ACUTE ABDOMEN.

Operative and Post-Operative. By ZACHARY COPE, B.A., M.D., M.S. Lond., F.R.C.S. Eng., Senior Surgeon to Out-Patients, St. Mary's Hospital, Paddington. Oxford Medical Publications. London: Humphrey Milford, Oxford University Press. 1926. Pp. 254. 10*s*. 6*d*.

THIS is a volume companion to the author's well-known monograph on the Early Diagnosis of the Acute Abdomen. It is primarily intended to help medical men not much practised in abdominal surgery who are called upon in emergency to deal with acute abdominal conditions. Far from being an exceptional experience, the spread of cottage hospitals all over the country has made this circumstance more and more common, and practitioners in remote parts constantly have to deal with conditions outside the experience of their ordinary practice. To such men this volume should prove an invaluable aid. Lucid and concise directions are backed by sketch drawings which are so clear that it is scarcely necessary to read the text in order to appreciate the detailed technique of even complicated operations. The chapter on preparation and after-treatment will be invaluable to those who cannot depend on the help of an experienced sister. Any doctor who is liable to run the risk of having to perform an emergency operation should obtain this book and master its contents before the emergency arises.

THE LAW RELATING TO DENTISTRY.

The Law and Practice Relating to Dentists and Dentistry. By ALBERT CREW, Barrister-at-Law. London: John Bale, Sons and Danielsson. 1926. Pp. 228. 10*s*. 6*d*.

Mr. Albert Crew has brought together in a handy volume the Dentists Acts of 1878, 1921, and 1923, with explanatory notes and comments and with the Dental Board's Regulations and Standing Orders. His chapters on professional ethics, infamous conduct, professional negligence, and professional partnerships contain matter of value and interest to medical as well as dental practitioners. An earlier chapter on the functions and characteristics of a profession is somewhat discursive and is better suited to the same author's similar volume on the profession of an accountant. Accountants, a body organised and controlled without statutory assistance or authority,

may be interested in the privileged position which dentists enjoy, but dentists, having obtained a full measure of statutory monopoly, are no longer concerned with the informal status of less fortunate callings. Mr. Crew rightly emphasises the enviable position of the dentist's profession, now so completely protected by Parliament that no poachers are allowed in that preserve. The medical profession is itself less secure. The book gives a useful summary of decided cases, including Binns *v.* Dental Board and Canton *v.* Dental Board, two decisions which interpreted with a surprising elasticity the words in the Dentists Act of 1923 whereby service during the late war in His Majesty's forces was made one of a group of qualifications for admission to the register. The position of dentists in view of the changes in the political administration of Ireland is dealt with, but might perhaps be further elaborated. Against Subsection 15 (1) of the 1921 Act a note might be inserted in respect of the words allowing proof of regulations "by the production of a copy purporting to be printed by any printer in pursuance of an authority given by the Privy Council." It is understood that the Privy Council does not, in fact, authorise any printer in this connexion, except the King's Printer (i.e., the Controller of H.M. Stationery Office), which means that in practice the Regulations appear in Statutory Rule and Order form and presumably would prove themselves as such, apart from the subsection above quoted.

OPHTHALMIC NURSING.

By MAURICE H. WHITING, O.B.E., F.R.C.S., Surgeon, Royal London (Moorfields) Ophthalmic Hospital. With an Introduction by Sir JOHN PARSONS. London: J. and A. Churchill. 1926. Pp. 173. 5*s*.

MOST nurses go through their general training with little experience of eye work, and to many the eye remains almost as mysterious a structure at the end of their course as it was at the beginning. If they are unable to obtain experience in the eye ward of their hospital or in a special ophthalmic hospital they can, at any rate, gain some assistance from a book of the right sort. This volume is based on the methods employed at Moorfields Ophthalmic Hospital by a member of its staff who formerly held the post of resident medical officer in its wards and is thus well qualified for his task. It is addressed not only to nurses but also to medical students, house surgeons, and practitioners, and contains sound elementary information on optics, diseases of the eye, and operations, besides actual directions for ophthalmic nursing. From the nurse's point of view, perhaps too little stress is laid on those minute details for which she is primarily responsible in the preparation and after-treatment of patients undergoing major operations. The chapter on Refraction and Treatment Clinics for School-children is valuable.

VISCERAL RADIOGRAMS.

A Descriptive Atlas of Visceral Radiograms. By A. P. BERTWISTLE and E. W. H. SHENTON. London: Henry Kimpton. 1926. Pp. 250. 21*s*.

THE title of this book is well chosen. In some 250 pages the authors have brought together a pictorial survey of almost the whole field of radiology, other than that of the bony structures with which one of the authors (A. P. B.) has already dealt in a previous volume. In order to make the atlas representative the illustrations have been drawn from the practices of a large number of radiologists, surgeons, and physicians; to each radiograph is appended a short, concise clinical history, a description and a small line drawing to emphasise the salient points of the picture; 327 excellently reproduced illustrations are included, and the authors have been wise in their selection, the relative balance of importance being well maintained. While referring to practically every innovation, they have held their hand in regard to methods which may or may not be of ultimate service. For instance, only one illustration is devoted to the phenolphthalein test of gall-bladder efficiency, two to ventriculography, and not even one illustration is given to pneumoperitoneum which had a brief vogue a few years ago. Two pages, however, are devoted to the lipiodol injection into the subarachnoid space of the spine, these being from the practice of Prof. Sicard. Sufficient illustrations of the use of pyelography are included to indicate that this has become a routine method of more than passing importance.

While admiring the skill with which this atlas has been compiled, we are sure that the authors have recognised that radiography is too vast a subject to be taught in this way. Clinical observation with the aid of X rays is essential, but as an outline of this vast aspect of medicine the volume will be of service, particularly to those who cannot command the services of an expert radiologist who is trained in this specialised outlook on medical science.

The publishers are to be congratulated on the way in which the book is produced at such reasonable cost.

THE NATURE OF LIFE.

A Bipolar Theory of Living Processes. By G. W. CRILE. New York: Macmillan Company. 1926. Pp. 405. 21*s*.

THE processes which distinguish the living from the non-living are due to electrical forces within the protoplasm which endow it with the essential qualities of irritation, assimilation, and reproduction. This potential within the cell is created by variations in oxidation on the two sides of the lipoid films which separate nucleolus from nucleus, nucleus from cytoplasm, and cell from environment. Such is, we believe, the pith of the interpretation of life which Dr. Crile urges upon us. And it has all come from a long attempt to explain the phenomena of shock which, in his capacity as a great practical surgeon, he has been so successful in preventing. He may be right. No one can say, for he deals with imaginative fields where right and wrong are matters of faith. But he brings forward a great variety of curious observations which may be studied with profit even if they do not compel belief in the meaning which he reads into them by parallels which seem mostly unreal and analogies which seem mostly false. His writings on the anatomical signs of fatigue in cells or on the temperatures of the blood and organs under various experimental procedures are of interest. But it is hard to believe that Dr. Crile really expects us to take seriously his comparison (Fig. 61) of the positive nucleus and the negative electron of a hydrogen atom with the nervous system and the rest of the body respectively of man. He may be right, but, if he is, it is as a prophet, not as a demonstrator.

JOURNALS.

FOLIA CLINICA CHIMICA ET MICROSCOPICA.—We have received the first number of a re-issue of this periodical after an interruption of 11 years owing to the war. It is edited by Dr. L. Zoja, of the University of Milan, and will be devoted to clinical investigations in microscopy, bacteriology, and chemistry. The journal aims at familiarising practitioners with laboratory diagnosis. Its editor belongs to the school of Alberto Riva in which the accurate and minute study of the patient is considered to be pre-eminent and laboratory investigation is held in honour in as far as it helps to solve diagnostic or theoretical problems which arise during this study. The present number contains articles on the estimation of hepatic function by means of spontaneous or induced ammoniæmia, on the bacteriolytic principle of d'Hérelle, and on the Wassermann reaction with concentrated serums.

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A most informative collection of drugs and appliances used in the art of medicine and surgery, organo-therapeutic, bacteriological and pharmaceutical remedies, electro-therapeutic apparatus, and many ancillary agencies, such as dietetics, and hospital and invalid furniture, were displayed. The medical man is essentially a student, but in these days progress is so rapid that even the attendance at post-graduate courses hardly suffices to keep the practitioner abreast of present-day treatment. An exhibition of this kind affords an opportunity to the busy practitioner to see the products and inventions which follow so closely on advances in treatment or technique, and to appreciate the labours of the various firms who, in response to the scientific requirements necessitated by research, administer to the needs of medicine and surgery. That the exhibition really fills a need is shown by the large number of medical men who visited it between the hours of noon and 6.30 p.m. each day, and by the keen interest which they took in the exhibits. In addition, the exhibition afforded an opportunity for friendly discussion and social intercourse, for which arrangements were made by the organisers, while the presence of many foreign and overseas visitors, some 300 of the latter having applied for tickets, showed the wide appeal of this display of scientific medicine and surgery.

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The attendance, which was exceedingly good, was confined to the medical profession, the general public not being admitted, and several thousands of medical men from all parts of the Kingdom found ample to interest them in the displays made by the leading firms. The Exhibition, year by year, has become more professional. It was noticeable on this occasion that the exhibits demanded more than one visit from many members of the medical profession, and there can be little doubt from the repeat inspections that practitioners found many of the demonstrations not only interesting and educational, but of immediate application in practice.

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THE LANCET.

LONDON: SATURDAY, SEPTEMBER 18, 1926.

THE LEGAL DISABILITIES OF HOSPITALS.

If all the generous promptings of intending donors were to materialise and the proceeds to pass unabated into the coffer of the hospitals, the anxiety of their treasurers would be in large measure relieved. On a later page of this issue is an account of what may well be hoped is the last of a series of frauds in the diversion of charitable contributions into private pockets. This source of loss, though deplorable, should hardly be large or persistent, but there are other more subtle disabilities with which hospital finance has to cope, and in a recent address[1] to the British Hospitals Association, Sir JOHN PAGET, K.C., acutely analysed the legal disabilities of hospitals, due to the gratuitous nature of the services they render. Hospitals—at any rate those which are supported by voluntary contributions—are what the law calls eleemosynary institutions; they exist, as Chief Justice HOLT observed 150 years ago, "for those that are poor and mean and lowly and sickly." And, because they are generous in their charitable work, they are under a heavy legal disadvantage. To begin with, a promise to contribute money to a hospital is not legally binding. A promise to pay something for services which are given gratuitously is a promise which lacks the legal essentials of a valid contract, though it is possible (but by no means certain) that a legal contract might arise if the subscriber authorised a specific expenditure which is incurred by the hospital in reliance upon his making it good. An even more serious disability of the voluntary hospital system is the familiar fact that hospitals cannot sue for the cost of the treatment they supply even when there is some well-to-do person who is morally liable. Let us take the case of traffic accidents. These are an important element in the congestion of hospital accommodation. Not long ago, says Sir JOHN PAGET, the senior house surgeon of the Bedford County Hospital was complaining that urgent cases requiring operations such as appendicitis had to be turned away owing to the number of beds occupied by motor accident cases. Sir JOHN PAGET quoted a figure of over 40,000 as the number of the traffic accidents in the metropolitan police district last year. It is reasonable to assume that a large proportion of these found their way to a hospital, and doubtless in many such cases the victims recovered damages for the negligence of a motorist. But it is certain that the hospitals got nothing. A plaintiff who claims damages for negligence on the part of a motorist often gives particulars of having incurred expenses for surgical and medical appliances and for nursing and medicines, and these expenses the law courts will allow him to recover. But no plaintiff is allowed to say that he has been a source of expense to a hospital as the result of the defendant's negligence, and that the defendant ought to make good that expense. The public probably does not realise the strange consequences of the legal position. As Sir JOHN PAGET pointed out, it pays the reckless motorist to run down a poor man rather than a rich man; the poor man is more likely to receive treatment in a hospital for which the motorist cannot be made to pay, while the rich man is more likely to be treated in his own home, and all the expenses of that treatment from specialists at the beginning to sea voyages at the end are items for which claim can legally be made. Similarly, it pays the reckless motorist, if he runs down a rich man, to injure him so severely that he must be treated forthwith in a hospital instead of being taken to his own home.

It is patently an unfair arrangement which makes hospitals bear the burden of another's negligence and yet gives them no *locus standi* when compensation is assessed. Is there any possible remedy? Perhaps the most practical suggestion is Sir JOHN PAGET's proposal to develop a feature of our workmen's compensation law. Under Section 8 (2) (v.) of the 1925 Act the compensation in fatal cases, where the workman leaves no dependants, is to be a lump sum equal to the reasonable expenses of his medical attendance and burial, not exceeding £15. Under Section 26 (1), if the workman has no legal personal representative, the compensation may be paid direct to the person to whom the expenses of medical attendance and burial are due. Sir JOHN PAGET pertinently asks why, if the undertaker can thus make a direct claim, the hospital should not be allowed the same privilege. No doubt any alteration of the law in the direction of allowing hospitals to recover money promised by patients or to sue for their fees and charges would require special legislation. But there seems no reason why Parliament should not enact that, in cases of injury due to negligence, hospital expenses may be added to the plaintiff's statement of claim and recovered from the defendant. When the legislature comes presently to consider the passing of a new Act dealing with road vehicles and traffic, there will be an opportunity to ventilate some such proposal.

Opponents of a change in the law will not fail to remind the hospitals that there is another side to the picture. A barrister's services are deemed in law to be honorary and gratuitous; he therefore cannot sue for his fees, but, on the other hand, he cannot be sued for negligence. Similarly, the hospital which gives gratuitous treatment, if it cannot recover the cost of the treatment, can nevertheless not be made liable for injuries to patients or inmates arising from the negligence of its physicians, surgeons, nurses, or assistants, provided that due care and skill has been exercised in the selection of the staff. This immunity might have to be surrendered, together with the modified immunity from certain forms of taxation which hospitals enjoy, if the principle of gratuitous service were abandoned. The alternatives, however, deserve consideration, for the voluntary hospitals must explore every possible avenue of prospective income. The amounts of voluntary contributions will, we fear, show some falling off if the prolonged coal stoppage causes an increase in income-tax next year.

[1] THE LANCET, July 3rd, p. 32.

NEPHRITIS: A NEW HYPOTHESIS.

CLASSICAL teaching in this and other countries distinguishes two common varieties of nephritis: an œdematous or hydropigenous type with retention of chlorides, and an azotæmic or uræmic type with nitrogen retention but normal chloride excretion. And it has become customary to explain the typical difference as due to the part of the kidney affected, whether that concerned with the excretion of urea or of non-nitrogenous crystalloids. There have always been difficulties in this anatomical theory, for one type of disorder may pass rapidly into the other, and in the dropsical type the blood chlorides are not

notably increased in spite of the low chloride content of the urine, whereas in calculous anuria a concentration of plasma chlorides is seen far in excess of the normal figures. A novel and admirably argued explanation of the biochemical features of nephritis is to be found in a recent article by Dr. A. M. FISHBERG,[1] of New York, who after prolonged investigation finds no evidence that a damaged kidney is ever affected as regards one excretory function without the others being equally impaired. He emphasises the differences in concentration of various blood constituents which the normal kidney brings about when secreting urine. Thus urea, uric acid, and phosphates are normal concentrated from 30 to 60 times before reaching the ureters, whereas chlorides, sodium, and calcium are normally scarcely concentrated at all. When, therefore, the kidney's concentrating function is adversely affected the result is at once seen by an increase in the urea, uric acid, and phosphates in the blood, whereas the chlorides, sodium, and potassium are not altered. O. L. V. DE WESSELOW,[2] in a recent article, drew attention to the failure of the grossly damaged kidney to concentrate the urinary chlorides after a salt meal. He showed how such a meal demonstrates a lack of concentrating power just as great for chloride as for urea, and in a paper which appears in our present issue brings forward still more conclusive evidence to this effect. FISHBERG justly emphasises the extrarenal excretory powers of the body which, together with a natural diminution of chloride intake in nephritic cases, prevents any accumulation of this element in the blood. Of the dropsical type of Bright s disease FISHBERG says that many belong to that class described by EPSTEIN [3] in which the protein content of the blood is so lowered that a transudation of chloride and water into the tissues occurs as a purely osmotic phenomenon. Other cases of nephritic dropsy are due either to myocardial degeneration or to damage to the capillaries, the dropsy being in fact always extrarenal in origin, and the diminished chloride excretion a result and not a cause of the œdema.

FISHBERG himself has come to regard the specific gravity of the urine to be almost the most delicate and reliable of all tests of renal efficiency; it is nearly 30 years since KORANYI[4] demonstrated that in uræmic cases the conductivity of the serum remains normal, whereas its freezing-point is greatly lowered, physical facts which to-day are explained by an increase in molecular concentration (i.e., non-protein nitrogen) without gross change in the concentration of electrolytes. FISHBERG finds that in all patients with severe renal damage the maximum specific gravity of the urine, even after prolonged deprivation of fluids, seldom reaches 1015 though it is rare for it to fall below 1010, proving that some concentrating power is still left In order to study this subject a modification of VOLHARD'S technique has been adopted, the patient receives no food or drink after his evening supper, voids his urine in the morning, and subsequently supplies hourly specimens for three hours. In a normal man these latter specimens will show a specific gravity approaching 1030, but in no case of uræmia did it reach 1020, and often remained in the region of 1010. The final deduction made by FISHBERG is that two stages may be observed in cases of renal hypofunction, which he terms those of compensation and decompensation. In the former there is a loss of concentrating power alone which is compensated for by polyuria so that the blood chemistry is undisturbed; in the decompensated stage polyuria either disappears or is insufficient to excrete the waste products, and in consequence the nitrogenous constituents accumulate in the blood giving the typical picture of nitrogen retention. Oliguria, according to this hypothesis, if due to impaired renal function, is but the terminal stage of impaired renal function which affects the excretion of all the urinary constituents. But extrarenal causes of diminished water excretion are far more common, ranging from cardiac failure to the osmotic retention described by EPSTEIN. Such cases can be recognised by the fact that such urine as they do eliminate has a high specific gravity. "Prerenal deviation" is the phrase chosen to describe this phenomenon.

Time alone will decide to what extent FISHBERG'S views are acceptable, particularly as regards the problems of anasarca, but he has formulated a thesis so lucid and logical as to merit close attention. The work of DE WESSELOW has pointed consistently in the same direction, and appears to provide strong support for this view.

[1] A. M. Fishberg: Arch. Int. Med., 1926, xxxvi., 259.
[2] O. L. V. de Wesselow: Quart. Jour. Med., 1925, xix., 53.
[3] A. A. Epstein: Amer. Jour. Med. Sci., 1922, clxiii., 167.
[4] Koranyi: Ztschr. f. Klin. Med., 1897, xxxiii., 1.

TERMINAL DISINFECTION.

ATTENTION was recently called in our columns[1] to the increasing scepticism with which the modern sanitarian is regarding terminal disinfection of premises as still practised in this country when a case of infectious disease recovers or dies or is removed to hospital. A reasoned statement of the case against terminal disinfection is contained in an article[2] entitled "La Pratique Actuelle des Désinfections Finales," by Prof. Carlos Chagas, Director-General of Public Health in Brazil. Prof. Chagas, who writes as one whose mind is already made up, cites much bacteriological evidence to show that practically all the non-sporing bacteria and protozoa rapidly lose their virulence and power of infection when removed from their natural habitat in the animal host unless carefully nurtured under laboratory conditions. Disinfection is therefore unnecessary, as the virus rapidly succumbs under ordinary domestic conditions. In any case he regards it impracticable to expose all the micro-organisms for a sufficiently long time to the action of chemical solutions or lethal fumes. In Rio de Janeiro disinfection on a large scale was virtually dropped in 1920 without untoward result. Incidentally Prof. Chagas notes the absence of any influence on the tuberculosis curve from radical housing reform carried on in Rio since 1923. He argues that terminal disinfection by health departments diverts public attention from real prophylaxis which takes cognisance of the dangers associated with the patient during the acute phase of his illness, the anomalous and ambulant forms of communicable disease, and the human carrier of infection. He admits that some concession may have to be made for a time to public prejudice by employing a modified form of terminal disinfection, which amounts to little more than an ordinary "spring cleaning." The money saved by discontinuing elaborate technical processes would be well spent on paying health visitors whose function would be to educate those in charge of infectious cases, both as regards the care of the patient and the prevention of the spread of infection. We think that those who agree in the main with Prof. Chagas will nevertheless take note that he quotes only such bacteriological evidence as supports his case. The typhoid bacillus does not always succumb in drinking water within 12 to 14 days, and the search for human carriers can scarcely be so

[1] THE LANCET, 1926, i., 1045.
[2] Office Internationale d'Hygiène Publique Bulletin, May, 1926.

successful as to permit of all other sources of infection, save the actual patients, being disregarded. His contention that disinfection following plague is valueless because it does not get at the rat and its fleas takes no account of the view expressed by Lethem that the *Pulex irritans* plays a part in the spread of plague in this country.[3] Plague bacilli have been demonstrated in pulex by the Indian Plague Commission and by Verjbitski, and the epidemiological circumstances of small outbreaks, as instanced by Lethem, are strongly in favour of his thesis "that in this country the first case of an epidemic is infected by a rat flea, usually found in grain or rags," but "that just as plague in rats is spread by rat fleas, so is plague in man in cold climates spread by human fleas, once the disease is started." This sequence of events is worth recalling in connexion with the small outbreak of bubonic plague in Liverpool, reported in our last issue. The fact that one of the cases—but not the first—was a dock labourer is not in itself sufficient ground for impugning the rat. Investigations now being made by the health department with the assistance of the Ministry of Health may throw fresh light on the subject. Chagas, again, does not even mention the rôle of the infected louse in the propagation of typhus, although terminal disinfection may well be justified in that disease. But with these exceptions his argument appears well founded in relation to the prevalent epidemic diseases of civilised communities. Judging by a recent leading article in an American medical journal,[4] our attitude to disinfection is regarded as somewhat more conservative than that of the United States, and a thorough discussion of opposing views is recommended. An incident which occurred in the little town of Godmanchester well illustrates the difficulties which may arise in practice. Here the sanitary authority regarded the occurrence of three or four cases of scarlet fever in a school as sufficient reason for its thorough disinfection. The county medical officer thought otherwise, and the indignant council passed a unanimous resolution of dissatisfaction with such "dilatory methods." There is much need for education of the public in modern ideas as to the spread of communicable disease.

Annotations.

"Ne quid nimis."

EARLY TREATMENT OF CANCER.

IN the annual report of the medical officer of health for Willesden, issued not long ago, is a memorandum by Dr. W. D. Champneys on cancer, indicating what methods of attack have been employed in the fight against this disease elsewhere, and what methods might be employed in the large urban district where he works. The introductory pages of this memorandum deal in succession with the nature, distribution, cause, mortality, prevention, diagnosis, and treatment of cancer; they are so lucid and concise that they might well serve as a model for others who are drafting similar pamphlets. One word of caution should be added. The statement that the recorded mortality from cancer has trebled in the space of two generations, although literally true, is misleading, for in the decade 1851–60, which is taken for comparison, little was known about the diagnosis of cancer. In the final section of the memorandum Dr. Champneys outlines a scheme for the control of cancer. To this end he would convene meetings of local medical practitioners to discuss the means to be employed and he would get recognised authorities to deliver post-graduate lectures and demonstrations. Leaflets and pictorial posters would be distributed to the public, articles inserted in the local press, and popular lectures given. But by far the most important measure for securing early diagnosis and treatment is, in the opinion of Dr. Champneys, one that has so far not been tried in this country—namely, the cancer clinic for free diagnosis. Such a clinic would be established or maintained by the local authority, provided with X ray equipment and beds for the temporary admission of suspects to enable a thorough examination to be made. Diagnosis would be free except for a small charge for a barium meal when administered. It is on this proposal for a free clinic that Dr. Champneys will meet with criticism. The diagnosis of cancer in its early stage is, except in a few selected sites—e.g., tongue, skin—impossible without operation, and even after operation and examination of a portion of tumour removed it has recently been recognised that senile involution (in the prostate, for instance) may closely simulate malignant change and be mistaken for such. A free clinic would by no means ensure the certain diagnosis of cancer in the earliest stage when it can be cured. In the United States of America, where active propaganda has been carried on for a decade to ensure early diagnosis, the mortality from cancer has not fallen, the effect of the propaganda being rather to increase the number of cases detected at an operable stage. The taxpayer may also have something to say to the proposal, for, if cancer is not a contagious disease and the sufferer from cancer not a danger to the community, as is the tuberculous or syphilitic, there seems no reason why he should pay for the individual who refuses to go to a doctor when he suspects some illness. Free diagnosis for cancer would command the support of those who desire free diagnosis of other diseases; in a word, the institution of a State medical service. Moreover, life assurance companies would presumably provide means of early diagnosis for their clients, if their actuaries were to advise them that by so doing mortality could be reduced.

A far better way of securing early diagnosis is by a campaign designed to induce men and women who are conscious of any tumour, sore, or disorder of function to consult their family or insurance practitioner without delay, particularly if they are reaching middle-age. In a brief Memorandum[1] on Cancer of the Breast, which has been issued from the Ministry of Health in continuation of the memoranda on the same subject which have been appearing during the last three years, the dissemination of information on the good results achieved by operation at an early stage is suggested—this to be by means of leaflets, talks, advice from local cancer committees, doctors, health visitors, and social workers. Educative counsel directed towards securing effective treatment of earlier conditions which have been shown commonly to precede cancer is also recommended. The present Memorandum has relation especially to the results of surgical operation in connexion with breast cancer, and supplements especially the information given in the third Memorandum of the series (THE LANCET, 1924, i., 1074). It incorporates the results of the survey made by Dr. Janet Lane-Claypon with the help of Dr. Major Greenwood, whereby the previous conclusions in respect to the value of the complete operation at an early stage have been confirmed.

A SOURCE OF CHOLERA INFANTUM.

THE syndrome of cholera infantum, comprising sudden severe diarrhœa with dehydration and collapse, has been found by many observers to occur in the absence of any ascertainable infection of the gastro-intestinal tract, and of any epidemic source of infection. The origin of the disorder has accordingly been referred to as "parenteral," without any definite

[3] The Epidemiology of Bubonic Plague in Great Britain. By William A. Lethem, *M.C.*, M.D. Journal of State Medicine, November, 1923.
[4] Boston Medical and Surgical Journal, June 24th.
[5] Medical Officer, July 3rd.

[1] Cancer.—v. Circular 716. Ministry of Health, Sept. 16th, 1926. Pp. 11. 1*d*.

localisation of the focus concerned; it has been held likely that this is a variable factor dependent on local and climatic conditions. Dr. Philip C. Jeans and Dr. Mark L. Floyd[1] have been led by post-mortem examinations of unexplained cases to believe that the focus of infection in cholera infantum is most frequently to be found in the mastoid or paranasal sinuses. They do not state, but appear to suggest, that the relation is a constant one, and they are prepared to treat all cases presenting choleraic features in infants by exploration of these sinuses. The six cases which they describe furnish a chain of evidence which is certainly very convincing. In all six cases pus was found in the antrum or sinus, and those in which drainage was established recovered, while those in which it was not established died. Most of the cases occurred not in the summer months when bowel infections are prevalent, but in autumn or winter when the incidence of respiratory diseases is high. From the otological standpoint they showed certain peculiar features; the mastoid infections were all bilateral, and none of them were evidenced by any of the usual diagnostic signs. These observations, in conjunction with the fact that cholera infantum is not a common accompaniment of manifest mastoiditis, suggest that the clinical syndrome described may be produced by some more or less specific infection of the mastoid with characteristics of its own. It is for this reason especially to be regretted that the authors' account contains no reference to the bacteriological characters of the infections. Information on this point would be of great interest and might yield further indications for prophylaxis and treatment.

THE WORLD INCIDENCE OF DISEASE.

The Health Organisation of the League of Nations at Geneva has recently issued a large quarto book which gives a summary of the statistics of notifiable diseases in 1925 in 33 European, 34 African, 24 American and 23 Asiatic countries, and in Australasia. The data are naturally of varying merit and accuracy; some represent the highest pitch of health statistics which has been reached as yet, some are probably unreliable, at any rate, in detail. And if it did nothing else, a publication such as this may be confidently expected to stimulate a progressive improvement in the collection of data, to enlarge the area in which statistics are attempted, and to raise the standard of all the returns to approximate to the best. One who turns the pages even casually can see the value of such an accumulation of facts to the serious students of the world's health, especially along two lines. There are, on the one hand, the diseases which are liable to be carried from one part of the world to another. An agreement has been in operation for many years by which any plague-infected port is notified to everybody, so that ships coming from there may be treated with due respect.

The report deals at some length with the prevalence, rise or decline of plague all over the world, and is illustrated with instructive maps. Every continent except Australia is more or less infected, from California to Celebes, and from the Black Sea to the Cape and Brazil. Serious epidemics in 1925 were limited to Nigeria, Kenya, Uganda, Madagascar, India and Java, and the whole will make anyone wonder what is to be the progress and termination of the pandemic which started out of Southern China 32 years ago. The figures for anthrax are useful in the same way. Of the countries making returns, Italy and Russia stand out. Italy has about ten times as many cases as Germany, and Russia about ten times as many as Italy. Within the United Soviet Republics it is far more prevalent in the Caucasus, the Crimea and other parts of the south than in the north, and infection may be specially expected in material coming from the Black Sea ports. The practical utility—indeed the practical necessity—of this kind of information needs no further illustration. The statistics are equally useful in another direction. It comforts us to know that the deaths from tuberculosis in London were 107 per 100,000 people, while they were 291, 280, and 204 in Budapest, Paris, and Vienna. But we hope it will stimulate us to better things still to read that the rates were 87 in The Hague and New York, and 83 in Chicago.

To know from example what is within the range of achievement is one of the most potent factors in human progress. The tale of infant mortality, which is conveniently summarised for 15 great cities since 1881, is the most conspicuous lesson of this. Forty years ago six had rates of over 200, and only one was less than 150; by 1900 Buenos Aires had got down to 93, and eight others were below 150; in 1925 only five were over 100, and the highest was 126. No one would have thought it possible till confident health officers began to show that it could be done. At the end of the volume is an informative table showing what diseases are notifiable in each country, and those who are fond of odds and ends of curious information will find them abundantly throughout.

[1] Jour. Amer. Med. Assoc., July 24th, 1926.

ANTIDIPHTHERITIC MEASURES IN BELGIUM.

THE prevention of diphtheria is making headway in Belgium, where the small distances and dense population set a problem more easy of solution than in many countries. The fact that isolation is enforced less strictly in the case of diphtheria than in other infectious diseases facilitates an estimate of the value of the measures applied, especially in the schools, which are not closed as a routine measure when cases of diphtheria occur in them. In Belgium it is not obligatory on practitioners to notify diphtheria; a fee of 5 francs is offered for so doing, but probably many cases elude official notice. Diphtheria antitoxin is, however, available free for the use of doctors where there is any chance of the patient being unable otherwise to get it, and apparently advantage is widely taken of this privilege. Dr. A. Bessemans, Chief Inspector of Hygiene, has recently reported[1] to the International Health Office on the means taken in Belgium to discover susceptible persons and to confer upon them an active immunity. The experience of the Belgian Health Service now covers more than 5000 persons who have been subjected to the Schick test, and the figures, classified in age-groups, bring out well the resistance inherent in the child at birth, its gradual loss within the first two or three years of life, to be replaced by a progressively increasing resistance acquired from exposure to infection. In the age-group 0 to 6 months the percentage of positive reactors was only 36, rising to 76 in the age-group 2–3 years, and gradually falling to 25 in the age-group 17–19 years. As elsewhere, a higher percentage of negative reactors was found in the poorer urban quarters, especially where overcrowded, a population in which a history of previous sore-throat is relatively common. Dr. Bessemans's observations on diphtheria carriers are particularly interesting. They give no sign of a high degree of natural or acquired immunity, a fact which suggests to him that it is not the mere saprophytic presence of bacilli in the throat which confers immunity, but a definite attack of disease, however slight. Dr. Bessemans makes the surprising statement that 41 per cent. of carriers of true (*vrais*) diphtheria bacilli, as against 44 per cent. of the community as a whole, were found to be positive to the Schick test. This statement seems to run counter to the whole Schick theory according to which a carrier of *virulent* bacilli cannot be Schick-positive, except possibly for a short space of time. The discrepancy has been cleared up by Dr. R. A. O'Brien, who has ascertained by correspondence[2] with Dr. Bessemans that the word *vrai* was not intended to imply *virulent*, for Dr. Bessemans was not able to test for virulence

[1] Office Internationale d'Hygiène Publique, Bulletin Mensuel, February, 1926.
[2] Public Health, September, 1926, p. 367.

more than a very small number of the cultures resembling the Klebs-Löffler bacillus obtained from carriers. Of the carriers with negative reaction, in many of them the negative reaction persisted for weeks or months, leading to the fair inference that a natural immunity does not aid its possessor in getting rid of lurking bacilli. Of 71 cases not recognised as carriers, but whose brothers and sisters had been reported to be such, 38 per cent. gave a positive reaction, as compared with 41 per cent., for brothers and sisters of actual diphtheria cases; the difference, though small, suggests that the presence of a carrier in the family may have a more powerful immunising effect than the presence of a case of diphtheria. Dr. Bessemans himself regards the Schick test as in the highest degree trustworthy, for to his knowledge no single one of the 3067 Schick-negative cases contracted diphtheria, while at least 11 Schick-positive cases contracted the disease, the diagnosis being confirmed by culture. Since the test is simple and has no drawbacks, he recommends its application to the personnel of infectious hospitals and institutions of all kinds. His report also contains a note on the value of toxin-antitoxin mixture in conferring immunity on Schick-positive cases, a positive reaction becoming negative within six months in 85 to 90 per cent. of inoculated individuals. He confirms Zingher's statement that no fear of anaphylactic symptoms need arise from repeated injections of vaccine, for it is always the first which provokes the greatest reaction.

TIREDNESS AND FATIGUE.

MANY persons, desirous of constantly draining the cup of life's activities to the lees, are often seeking for some wonder-remedy which will prevent tiredness or, at any rate, postpone it until a more convenient season. They would disregard Nature's call for rest and turn a deaf ear to the existence of fatigue. Tiredness and fatigue are not interchangeable terms, although the two things in most people march closely together. Tiredness is a subjective feeling, associated with a desire for rest. Fatigue is a condition of diminished capacity for activity and results from activity. There are, on the one side, the weary Willies of the world—persons born tired—for whom the ordinary static metabolism of life seems capable of originating feelings of tiredness. And, on the other, the acidly active, for whom the most strenuous exercise fails to elicit any desire for rest. In practice expenditure of energy to the point of exhaustion is safeguarded, and the utmost a wonder-remedy could do would be to lift the safety-valve and allow more energy to be expended than is physiologically advisable. A remedy of this type was reported [1] by Emden in 1921, who announced that during the late war the onset of fatigue had been delayed by administering acid sodium phosphate to German soldiers, to miners, and to animals; support seemed thus forthcoming for those who feel an uplift from the consumption of phosphates. A careful and well-planned scheme of research for following up the subject is, however, now reported.[2] First, experiments with animals were tried, but abandoned, because no normals or base lines for activity could be obtained. Then girls working card-perforating machines were placed under observation; they were being paid by piece-work, of which a record was carefully kept, and presented an ideal group for the study undertaken. The phosphate, similarly prepared to that used by Emden and kept below a laxative dose, was taken by 30 girls, while others acted as controls. The period observed was Feb. 15th to May 31st, the phosphate being given March 13th to April 24th. A feeling of well-being was experienced by the phosphate group, probably due to increased elimination of body-wastes, but no detectable increase of muscular efficiency occurred, while the average number of errors was not significantly different. The conclusion drawn is that the phosphate created a subjective sensation of less tiredness due to its stimulating action on the intestinal tract, but in no way affected the onset of fatigue. And so another wonder-remedy must be relegated to the scrap-heap.

[1] Emden, Schmitz, and Meincke: Zeitschr. für Physiol. Chem. vol. cxiii., 1921, p. 10; and Emden, Grafe, and Schmitz: Ibid., p. 67.

[2] The So-called Action of Acid Sodium Phosphate in Delaying the Onset of Fatigue. By F. B. Flinn. U.S. Public Health Reports, No. 29, July 16th, 1926. Washington.

THE STUDY OF DYING.

DEATH has been considered from many points of view, but it is doubtful if there has ever been any systematic investigation into the events of dying. Numerous books describe the death-beds of celebrated men, whilst much of the literature of medicine is devoted to the processes of dissolution and the means of postponing them; yet from the scientific standpoint there is little information available about the final hours of life. Writing with much experience of abnormal conditions of the mind, Dr. Arthur MacDonald, in our correspondence columns, suggests the collection of such information on a large scale. His proposal will be unsympathetic at first sight to those who feel that already there is often too much interference with the dying. To many the "systematic study" of the death-bed has a satirical flavour reminiscent of Léon Daudet's "Les Morticoles"—it comes as an addition to the horrors imagined about death. Yet the cogency of some of Dr. MacDonald's arguments must be admitted. It is by no means impossible that the study he suggests might lead to further and wider knowledge which would ease the final hours of those who retain their consciousness to the last. Attendance on the dying is a difficult part of a doctor's duties, and one in which he has to rely greatly upon his sympathy and judgment; the young practitioner must inevitably find himself sometimes at a loss, but it ought to be possible to ensure that dying shall generally be easier than it is. The subject is not discussed in text-books or lectures. It is hard to say whether spreading abroad more accurate knowledge of death would lessen or increase the general fear of physical distress, but medical men—Sir Henry Halford, Sir William Osler, Prof. Hermann Nothnagel, and many others—who have written on the subject have usually said that so much dread is by no means justified. Some of these opinions are summarised in Dr. Parkes Weber's "Aspects of Death and correlated Aspects of Life," which is itself rather a study of the possible mental reactions towards the idea of death in the living than a study of death and its phenomena. To those he mentions may be added a short essay by Prof. G. Perthes, of Tübingen, entitled "Ueber den Tod."

GOGGLES FOR ULTRA-VIOLET THERAPY.

FOR short exposure to the ultra-violet rays of the arc or mercury-vapour lamp ordinary spectacle glass is, as a rule, sufficient protection; but for operators who may be exposed to the effect of these rays for long periods something more is necessary. Various sorts of protective goggles are on the market, but some of them are not to be recommended. Thus Mr. B. D. H. Watters, of the Middlesex Hospital Physics Department, found that a certain grey glass which was being sold for this purpose transmits a considerable portion of the ultra-violet spectrum, with the result that the operator complained of headache and eye-strain after quite a short exposure.[1] Inasmuch as it may be necessary to protect the eyes against too strong exposure to the visible rays, a shaded or coloured glass will often be preferred. Mr. Watters found that a light green tint served the purpose. The thickness of the glass, and especially of a concave glass, is a factor which should not be left out of account. In order to exclude all the ultra-violet rays a spectroscopic examination of any

[1] THE LANCET, 1925, ii., 495.

unknown glass is essential. According to a chart published in a paper by Sir Arnold Lawson[2] Crookes's glass is constant in its absorption almost irrespective of the tint, Crookes A and Crookes B being practically identical in their absorptive power as far as the ultra-violet rays are concerned, but they only absorb rays of a shorter wave-length than about 360 μμ. London smoked glass No. 4 has a similar effect. Fieuzal glass No. 2 cuts off all the ultra-violet rays. Amber does not. For the operator it is desirable to secure the maximum amount of visible radiation with a minimum transmission of any rays with a wave-length shorter than 400 μμ. For the patient the choice need not be so restricted, partly on account of the short time during which he is exposed to the action of the rays and partly because in his case there is no objection to cutting off some of the visible light. The manufacturers of Arcos glass claim for it a total absorption of ultra-violet, as well as greatly reduced transmission of heat rays, and they supply an easily sterilisable form of goggles.

MEDICINE AT KHARTOUM.

THE School of Medicine at Khartoum, founded as a memorial to Lord Kitchener, is designed to meet the need for native doctors in a rapidly developing country. Native doctors are needed to work under British doctors at the larger hospitals, to take sole charge of smaller hospitals, and to engage in field work against the endemic diseases—malaria, bilharziasis, ankylostomiasis, yaws, and syphilis—which are interfering with the increase of the population and diminishing its efficiency. The school was opened in February, 1924, by the late Sir Lee Stack and work was commenced with a first-year class of ten students selected from young men who had completed their course of training at the Gordon College. A further class of eight students was admitted in January, 1925. The report, which has just been issued, tells of the work completed by the end of that year. Photographs show the handsome buildings, the lay-out of the laboratories, dissecting room, lecture room, and library, and students at work in them. The school stands in three and a half acres of land lying on the western side of the main avenue running north from the railway station to the Palace, which faces the Blue Nile, rebuilt on the foundations of Gordon's Palace. On the other side of the avenue is the Khartoum Civil Hospital. Adjacent to the hospital and fronting the medical school new research laboratories are being erected, and provision is being made in these laboratories for the teaching of pathology. A school hostel, under construction 200 metres away, will afford immediate accommodation for 40 students and admit of extension if called for later. The house of the medical registrar responsible for the work and conduct of the students is situated in the school enclosure. The curriculum covers a period of four years. The first year is devoted to the preliminary sciences; the second to anatomy, physiology, and histology; the third to medicine, surgery, and pathology; and the fourth year continues the third-year subjects and includes also lectures and demonstrations in public health, midwifery and gynæcology, and a brief course in forensic medicine. Clinical teaching is given in the well-equipped Civil Hospital, which has 100 beds and a large out-patient department. The hospital at Omdurman, a town of 80,000 inhabitants separated from Khartoum by the White Nile, affords additional material for clinical demonstrations. Importance is attached to the teaching of public health, for which the three towns with their combined population of 130,000 provide ample scope. With the exception of the registrar, all the teachers belong to the Government medical and scientific staff: thus the medical and surgical teaching is given by the physician and the surgeon of the Khartoum and Omdurman hospitals; public health teaching by the medical officer of health of these towns; pathological teaching by the Wellcome Research Laboratories. As a consequence the school budget is maintained at a figure which would otherwise be quite impossible; the total expenditure for the year 1925 with the first and second-year classes under training was only £2447. When the third- and fourth-year classes come under training the expenditure will increase in proportion and additional sources of income will have to be found. The progress made during these first two years points clearly to success in the future, and we hope that no question of financial stringency will be allowed to hinder a work so important to the material progress of the country and to the welfare of its people.

[2] British Journal of Ophthalmology, 1925.

UNIVERSITY OF EDINBURGH: THE D.T.M. & H. AND D.P.H.

THE Students' Number of THE LANCET was published this year at a time when the regulations for the degrees of B.Sc. and D.Sc. in Public Health at the University of Edinburgh were under consideration, but the regulations for the diplomas in Tropical Medicine and Hygiene and in Public Health are in order, as are the regulations for the diploma in Psychiatry. Candidates for the D.T.M. & H. diploma must be graduates in medicine and surgery of the University or hold corresponding degrees or qualifications from other sources, and the full course of instruction is given during the autumn term, beginning therefore in October. The diploma of the University in Public Health is granted to candidates of a similar standing, and the course is divided into two parts, for which examinations are held twice annually, in March and July for Part I., and in October and December for Part II. The course, which extends over 12 calendar months, begins in October, and provision is made by the University for instruction in all the subjects, while candidates must study for at least two of the three terms in the University. Detailed particulars regarding these diplomas, which are contained in full in the University Calendar, may be obtained from the Dean of the Faculty of Medicine at the University. This notice was accidentally omitted from the Students' Number of THE LANCET.

THE COOMBE HOSPITAL.

IN anticipation of the Coombe Hospital centenary celebrations, which have been held in Dublin this week, Dr. T. P. C. Kirkpatrick has contributed to the September number of the *Irish Journal of Medical Science* a sketch of the history of the hospital. In 1821 the Meath Hospital moved from the house it had occupied in the Coombe for just half a century to its present site in Long-lane. The vacant house was taken by Dr. Kirby, head of one of the private medical schools, who established 50 beds in it and used it for the clinical instruction of his students. Some years later the question arose of providing accommodation for maternity cases on the south side of the city, as patients suffered hardship in making the journey to the Rotunda Hospital, which was then the only maternity institution in Dublin. In 1826 it was arranged to take one ward in Kirby's Hospital for maternity work, and thus the Coombe Hospital began its special work. In 1829 the surgical part of the hospital was closed and the institution became the Coombe Lying-in Hospital, with Dr. Richard Reed Gregory as its first master. From the first the hospital paid much attention to teaching, and issued certificates to the pupils who attended its practice. These certificates were accepted by the Royal Colleges of Surgeons in Ireland, of England, and of Edinburgh, as well as by the medical boards of the Navy, Army, and Indian Medical Services. When, some years later, the Rotunda Hospital began to issue diplomas in midwifery which purported to be qualifications to practise, the Coombe followed suit, and acute controversy arose between the two institutions, the Rotunda holding that as the

Coombe had no charter it had no right to issue diplomas. It was not till 30 years later, in 1867, that the hospital succeeded in obtaining a Royal Charter. In the meantime both diplomas had lost much of their value by the passing of the Medical Act of 1858. While the teaching work of the Coombe Hospital was increasing in reputation the buildings were falling into decay, but fortunately good friends were found in successive members of the Guinness family, and between 1868 and 1877 it was rebuilt at their expense. Various improvements have since been made, and in the hands of recent masters the hospital has done much to enhance the reputation of Dublin as a teaching centre for obstetrics.

The Services.

ROYAL NAVAL MEDICAL SERVICE.

Surg. Capt. W. L. Martin to be Surg. Rear-Admiral.

The following appointments are notified:—Surg. Rear-Admirals: W. L. Martin to *Egmont* and for R.N. Hospl., Malta (on joining); and R. St. G. S. Bond to *Vivid* for R.N. Hospl., Plymouth. Surg. Capts.: A. R. Thomas to *Vivid* for R.N. Hospl., Plymouth; and R. W. B. Hall to *President* for service in Medical Dept., Admiralty, and as Deputy Medical Director-General. Surg. Comdrs.: A. R. Fisher to *President* for three months' post-graduate course; E. L. Atkinson to *Pembroke* for R.N. Barracks, Chatham, temp.; F. G. H. R. Black to *Vivid* for R.N. Barracks, Devonport, and for specialist duties; J. D. Bangay to *Victory* for R.N. Barracks, Portsmouth; L. MacEwan to *Dolphin* as Senior Medical Officer, Submarines; C. T. Baxter to *President* for Royal Victoria Yard, Deptford, for survey of stores; J. M. Hayes to *Egmont;* A. J. Tozer to *Ramillies;* J. T. Shorten to *Princess Margaret* and as ophthalmic specialist, temp.; R. F. MacMahon to *Pembroke* for R.M. Infirmary, Chatham; and F. Cock to *Egmont* for R.N. Hospl., Malta, as ophthalmic specialist (on relief). Surg. Lt.-Comdrs.: W. J. Colbourne, N. A. H. Barlow, J. E. Clark, W. A. Jolliffe, N. B. de M. Greenstreet, A. W. Cocking, and J. S. Elliot to *President* for five months' course of instruction; R. W. Nesbitt to *Victory* for R.M. Infirmary, Eastney; E. Heffernan to *President* for Royal Victoria Yard, Deptford, for survey of stores; and T. Gwynne-Jones to *Sandhurst.* Surg. Lt.-Comdrs. (D.): J. T. Wood to *Excellent;* J. F. Place to *Ganges;* and T. A. B. Corless to *Pembroke* for R.N. Hospl., Chatham. Surg. Comdr. (D.): H. M. Meek to *Pembroke* for R.N. Barracks, Chatham. Surg. Lts.: J. Hamilton to *Pembroke* for R.N. Hospl., Chatham, temp supy.; and M. Barton (short service) transferred to the permanent list.

ROYAL ARMY MEDICAL CORPS.

The undermentioned Capts. to be Majs.: J. Higgins, E. B. Marsh, C. Armstrong (Prov.), J. A. L. Wilson (Prov.), J. H. Fletcher, and D. G. Evans (Prov.).

Capt. E. N. P. Martland retires, receiving a gratuity.

The undermentioned to be Lts. (on prob.): F. M. Collins and J. A. Chapel.

The undermentioned to be temp. Lts.: R. A. M. Humphrey and W. A. Kerr.

ARMY DENTAL CORPS.

The undermentioned temp. Capts. Dental Surgs. Gen. List, to be Capts.: J. L. Gibson, F. W. Burke, S. H. Bannerman, J. W. Vasey, A. H. Kay, D. A. McGeorge, Allen Rhodes, N. F. Smith, J. L. Newton, and D. J. Muil.

The undermentioned temp. Lts. Dental Surgs. Gen. List, to be Lts.: B. Abbott, G. A. Ballantyne, F. H. R. Davey, F. F. Anslow, W. B. Purnell, F. S. S. Whiter, R. A. Roth, D. C. Blyth, C. E. Day, F. G. Arnold, R. H. N. Osmond, W. McAndrew, and B. J. Swyer.

ROYAL AIR FORCE.

Flying Officer F. L. White is granted a permanent commission in this rank.

The undermentioned are granted short service commissions as Flying Officers for three years on the active list: E. A. Rice and C. W. Coffey.

Squadron Leader C. L. Colbran is promoted to the rank of Wing Commander (Dental) on promotion to Lt.-Col in the Army Dental Corps.

INDIAN MEDICAL SERVICE.

The King has approved the relinquishment of his temporary commission by Lt. Behari Lal Chopra.

Modern Technique in Treatment.

A Series of Special Articles, contributed by invitation, on the Treatment of Medical and Surgical Conditions.

CLXXXIX.—THE MEDICAL TREATMENT OF CHRONIC DIARRHŒA.

II.—MANAGEMENT OF THE CASE.*

Gastrogenous Diarrhœa.

ANY likely cause of a true chronic gastritis (e.g., alcoholic excess, gross oral sepsis, excessive tea drinking) should be appropriately dealt with. Soups and condiments and hurrying over meals should be forbidden. Acid hydrochlor. dil. (B.P.) ℥ xx. to xxx. in a tumbler of orangeade or sugar and water, taken as a beverage during each of the three main meals, causes a prompt and complete cessation of the symptom in the majority of cases. Even smaller doses may be effective. Ultimately it may be possible to dispense with the acid or to rely on one or two doses in the course of the day. Where the acid is given for its antiseptic action as well as to control the diarrhœa (as in cases of pernicious anæmia) much larger doses, up to a drachm or more, t.i.d., should be employed.

Chronic Ulcerative Colitis and Chronic Bacillary Dysentery.

The treatment of these conditions may be considered under the headings of specific (or serum) therapy and non-specific therapy. The patient should be kept in bed throughout the period of intensive treatment and until the stools are formed. Specific measures should only be employed in cases which have been fully investigated, and steps should be taken to discover whether the patient has been sensitised by previous administration of serum. In cases in which cultural investigation of the stools or serological tests confirm a suspicion of infection with *B. Flexner* or Shiga polyvalent anti-dysentery serum should be given in full doses, and as Hurst[1] has shown, good results may also follow the same treatment in a certain proportion of cases of "non-specific" ulcerative colitis. The serum should be given by the intravenous route starting with a dose of 30 or 40 c.cm. and, unless reactions are severe, followed by injections given daily, or every other day, and increasing up to 60 or 80 c.cm. until 200 to 250 c.cm. have been given in all. The only drawback to serum therapy is its expense, but this is outweighed by other considerations. In successful cases there will already be an improvement in the patient's general condition at the end of a week or 14 days with a reduction in the number of stools. Within a fortnight or three weeks sigmoidoscopy may show commencing healing in the mucosal lesions of the lower bowel. The diet at first should be lacto-farinaceous with fruit juice, jellies, &c. It should be of ample caloric value, and include liberal fluids. No food containing vegetable residue or other indigestible fibre should be allowed. Careful attention should be paid to oral hygiene. Powdered charcoal (½ oz.) with arrowroot twice a day helps to diminish intestinal flatulence and pain. The colon should be irrigated once a day in the early stages with quantities increasing gradually from ½ to 1½ pints of a tannic acid solution (½ to 2 gr. to the oz.) or with weak silver solutions or normal saline, the fluid being introduced with the patient in the knee-elbow position or on the back with the hips well raised and after the bowels have been moved. A soft rubber tube and funnel should be employed, the tube being introduced not further than 3 to 4 inches

* An article in this series by Dr. Ryle on Chronic Diarrhœa: Investigation of the Case, appeared in THE LANCET last week.

[1] A. F. Hurst: Guy's Hospital Reports, 1921, lxxi., 26.

and the fluid run in very slowly with only slight pressure (not more than 1 foot). The patient should be encouraged to retain the injection a little longer each day up to half an hour. Iron should be given for the anæmia. A mixture originally suggested by Wedgwood[2] for use in typhoid fever and containing tr. ferri perchlor. ℥ x.–xx. with liquor hydrarg. perchlor. ʒss. three times a day has found several advocates. When the stools have become formed, as they may do somewhat abruptly in successful cases, liquid paraffin should at once be given to obviate constipation and consequent mechanical damage to the newly healed mucosa. Symptomatic improvement under treatment should be controlled by sigmoidoscopic examinations.

Chronic Amœbic Dysentery.

The effect of a course of 12 subcutaneous or intramuscular injections of emetine hydrochloride (gr. 1 daily) on symptoms and sigmoidoscopic appearances should be tried, particularly if the diagnosis has not previously been made. In cases which have previously had much treatment with emetine the results are less satisfactory. Emetine bismuth iodide (gr. iii. in salol-coated tabloids) given daily for 12 days and, more recently, stovarsol gr. iv. daily for 12 or 14 days have proved of value in resistant cases. Manson-Bahr[3] has also reported favourably on yatren both by mouth and irrigation. For more detailed descriptions of the treatment of chronic amœbic dysentery reference should be made to works on tropical diseases. Repeated courses of treatment are often necessary.

Spurious Rectal and Colonic Diarrhœa.

The treatment of the spurious rectal and colonic diarrhœas is the treatment of constipation. It should include strict regularity, ample fluids, a diet liberal in fresh and stewed fruit and green vegetables, avoidance of purgatives, employment of lubricant preparations such as liquid paraffin, and in cases with colonic spasm small doses of belladonna. Enemata in gradually diminishing quantity may be required in the earlier stages to re-educate the lower bowel, and in old persons it may occasionally be necessary to break up a fæcal accumulation in the rectum. The "diarrhœa" usually described as occurring "in attacks" and so bitterly complained of by sufferers from so-called muco-membranous colitis is usually made worse by (1) bismuth, chalk, and opium; (2) purgatives; and (3) douche treatment. Visits to spas for douche treatment should be discouraged. The diet should be as for a case of constipation, only seedy fruits and very fibrous vegetables being excluded. Lubricant preparations and belladonna and bromides may be employed. Four to six ounces of liquid paraffin injected into the bowel at bedtime and retained over night, a pad being worn, often gives relief in the more troublesome cases. Vigorous psychotherapy, instructions to the patient not to inspect her stools, emphatic assurance that the frequent actions are due to irritation of the bowel by scybala rather than to inflammation by disease, that the mucous discharge is nature's response to such irritation, and, finally, that there is no true colitis present, may contribute to a successful handling of these difficult cases.

Tabes Mesenterica and Cœliac Disease.

The usual hygienic measures, including proper rest, open air and sunshine, and controlled by temperature and weight records, must be employed for adequate periods in cases of tabes mesenterica with diarrhœa. In the milder cases a reasonable restriction of the fat intake is the only other treatment required. In the more serious cases with bulky stools, butter, cream, and the visible fat of meat should be excluded altogether, and the milk should be skimmed. Unless there is an associated ulceration of the small bowel these measures alone may bring about a prompt cessation of the diarrhœa, although the stools will remain bulky. In children especially it is important to provide fresh food elements in other forms such as fruit juice. Gull[4] was the first to point out how irrational it was to give fatty foods and cod-liver oil in cases in which large quantities of fat were being voided in the stools.

The treatment of *cœliac disease* is carried out on closely similar lines, and is described in detail by R. Miller in THE LANCET, 1923, ii., 1099.

Sprue.

Among the many treatments which have been employed in sprue the milk treatment is probably least liable to failure. Milk is given in large quantities, advancing up to six or even eight pints in the day, and at first no other form of food is employed. When the stools have become formed and the weight is gaining, easily assimilable carbohydrates are added, and later protein foods. Much has been made in recent times of the calcium and parathyroid treatment suggested by Scott.[5] This treatment has found many advocates, but among physicians with wide tropical experience opinions remain divided. For a fuller discussion of the treatment of sprue reference should be made to text-books on tropical diseases.

Pancreatic Diarrhœa.

The most important indication is to cut out fat from the dietary as completely as possible, as the fat indigestion is probably the main cause of the diarrhœa. If there is no glycosuria liberal carbohydrate feeding may be instituted. Ripe bananas are a valuable addition to the dietary, and glucose, cane-sugar, or lactose given in large quantities in lemonade and other fluids may help to maintain the weight. Of the protein foods those requiring the least trituration and digestion should be favoured. It is difficult to obtain reliable evidence as to the influence of the enzyme substances, but one of the preparations of pancreatin should be given with each of the three main meals.

Other Forms.

For *nervous diarrhœa* a codeine pill ¼ or ½ gr. taken occasionally before those events which have been found to precipitate the symptom may act effectively by controlling peristalsis and so help to restore confidence. Common-sense hygiene, proper mastication, instructions with regard to obtaining a complete evacuation each morning, and simple explanations concerning the mode of perpetuation of such symptoms by apprehension are also helpful. During times of mental stress a bromide mixture should be given.

In *diarrhœa due to excessive consumption of carbohydrate* it is only necessary to remodel the dietary and to insist on more exercise.

Diarrhœa following Gastro-jejunostomy.—In the more innocent form due to a too-patent stoma, dry meals, a short rest in the recumbent position after meals, and (if achlorhydria and no ulceration be present) small doses of acid and pepsin are generally effective.

Conclusion.

Of the varieties of chronic diarrhœa discussed above gastrogenous diarrhœa is the most common and incidentally the most tractable. Diarrhœa due to rectal or colonic carcinoma is also common, but too frequently attributed in the early stages to simple ulcerative colitis. The fatty diarrhœas and diarrhœa following gastro-jejunostomy are rare. An attempt has been made to review the various types in the order of frequency in which they are encountered in hospital and consulting practice in this country.

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Assistant Physician to Guy's Hospital.

[2] W. B. Wedgwood: Brit. Med. Jour., 1894, i., 1126.
[3] P. H. Manson-Bahr and R. H. Morris: THE LANCET, 1925, ii., 544.
[4] W. Gull: Guy's Hospital Reports, 1855, i., 369.
[5] H. H. Scott: THE LANCET, 1925, i., 620.

Special Articles.

A STUDY OF SCARLET FEVER.

EPIDEMIOLOGY AND PROPHYLAXIS.

EVER-INCREASING attention is being given to the epidemiology of zymotic diseases. A report prepared by Sir George Buchanan and Dr. Allan C. Parsons, which has just appeared, embodies the results of an inquiry carried out, under the auspices of the Comité de l'Office Internationale d'Hygiène Publique, into the comparative prevalence of scarlet fever, its characteristics, and the measures adopted for its prevention in various parts of the world. This report is essentially a summary of replies to a questionnaire sent out to some 30 countries, and appears in the *Bulletin* of the Office Internationale for June and July. Information was desired on four specific points: (1) the methods by which an estimation of the incidence of scarlet fever was arrived at, including notification, hospital statistics, and death certificates; (2) the special characteristics of the epidemics—prevalence, seasonal incidence, periodicity, morbidity and mortality rates, virulence, and any factors looked upon as of importance in the spread of infection, such as delayed notification or diagnosis, carriers, schools, and the like; (3) general methods of prophylaxis and of treatment; and (4) methods of terminal disinfection.

Notification.

The sources of information in the various countries are fairly comparable. Notification of scarlet fever is compulsory in most of the places in which it is endemic; in several countries the local health authority is notified by the physicians, by the hospitals, and by the education authorities, and the only countries in which a fee appears to be paid to the notifying physician are England and Wales, Belgium and Algeria. Deaths are registered in nearly all the countries in which the disease is notifiable. The prevalence of scarlet fever is not easy to ascertain, but it appears that the countries situated in the north-west and south-east of Europe are chiefly affected. The seasonal incidence is fairly constant; definite periodicity has usually been noted, although this varies a good deal in different countries and in different parts of the same country. The incidence rate per 100,000 of the population ranges from 224 in Northern Ireland and 218 in England and Wales down to 12 in South Africa, 9 in Greece, and 7 in Czecho-Slovakia. It is probable, however, that fewer cases escape notification in Great Britain than in most of the other countries on the list, and in any case the value of these figures, as also of the mortality rate, depends largely upon the completeness of census and death certification. With regard to the virulence of the disease, it would appear that in England, Norway, Sweden, and Holland the type has become progressively milder of recent years, although due allowance has to be made for the fact that larger numbers of notified cases are now admitted to the hospitals. In other countries, especially in South-Eastern Europe, the disease appears to be more virulent in type than in former years.

Infection and Susceptibility.

Most of those who replied to the questionnaire were clearly of the opinion that the spread of scarlet fever is almost entirely a personal question—i.e., that each fresh case is directly infected by some other person who may be either obviously suffering from scarlet fever, or convalescent from an attack, or else suffering from a mild, abortive, or unrecognised infection. The existence of perfectly healthy "carriers" is frankly doubted by most of those who replied on this point. Nasal, pharyngeal, or aural discharges are looked upon in many countries as the agents chiefly responsible for the spread of infection. Much work has been done, chiefly in America, on the results of the Dick test for ascertaining the susceptibility of a given subject to scarlet fever. A number of tables and charts prepared by Dr. Abraham Zingher and by the Dicks themselves are reproduced in this report, showing the high percentage (90·7) of negative reactions in the case of those who have already had an attack of scarlet fever, and the comparatively high percentage (75·4) of positive reactions in those who have never been infected. In another series of cases the test was applied to patients during an attack of the disease, the percentage of positive reactions being 98 during the first five days of the illness, 20 after the sixth day, and 8·7 during convalescence. The use of scarlet fever antitoxin as a preventive measure is warmly advocated by the Dicks, who have shown the direct correlation that exists between the quantity of toxin administered and the immunity obtained. They claim that their toxin can be safely administered in doses large enough to confer complete immunity, such immunity being attained in the course of two weeks and lasting for at least 18 months. As a curative measure the use of serum from convalescents is being tried with success in various countries, including Stockholm, Poland, and Czecho-Slovakia. Isolation hospital treatment is the rule in several of the countries, although not in all, opinions also differing as to the respective merits of barrier, cubicle, or ward nursing.

Quarantine.

An interesting point is the varying procedure as to isolation. In the United States an average of four to six weeks is usually required; in Stockholm six weeks; in Holland, five; in Italy and in Australia, four weeks. The same divergence exists with regard to desquamation. In Norway no notice is taken of desquamation of the feet, nor, in Sweden, of any desquamation after the sixth week. In many parts of Holland the state of the skin is not considered as any criterion of infection, certain authorities not regarding the skin as infectious at any period of the disease unless it has been contaminated by discharges. In Italy, Manchuria, and Bulgaria, on the other hand, the patient is usually considered infectious until desquamation is complete. A large variety of methods of disinfection are in use in the various countries. These are usually applied in the terminal stage, but it is of particular interest to note that in many countries in which sanitary science is making rapid headway there is a distinct tendency to give up the traditional terminal disinfection of sick rooms in favour of bedside or current disinfection of the patient. This is the case in Norway, Sweden, Bulgaria, Denmark, Holland, Canada, and a few of the United States of America, although in most of these countries terminal disinfection has not yet been entirely abolished. As Dr. Parsons points out, the newer method is practically an extension of the bed or "barrier" system of isolation, both being based on the theory that only the patient and the articles recently contaminated by him are infectious.

Epidemiology.

Another recent study on the epidemiology of scarlet fever is that by Dr. Alton S. Pope.[1] The data for this paper were collected by Dr. C. V. Chapin, who for 40 years has kept individual histories of all cases of scarlet fever reported in the American city of Providence. In all, the number of cases investigated has been 17,625, the writer explaining that: "By the intensive study of the disease over a long period in one locality, and the correlation of the findings with extensive researches, the attempt has been made to add something to the natural history of scarlet fever." The points made by Dr. Pope include the following. First, as to age distribution. Approximately 75 per cent. of all cases occur under 10 and 90 per cent. under 15 years, the greatest incidence being at six years. The highest mortality in scarlet

[1] Amer. Jour. of Hygiene, 1926, vi., 389.

fever occurs in the third year of life. Although there has been no appreciable change in the recorded morbidity of scarlet fever in Providence during the past 40 years, there has been a relative shifting of mortality from the lower to the higher age-groups, the mortality rates themselves also having fallen during this period from approximately 40 to 2 per 100,000. On the evidence available, the decrease in mortality appears to be due to a decrease in the malignancy of the disease rather than to any special measures adopted for its control. Attack rates in Providence show a slight excess among males up to the sixth year of life, and at all ages above 7 a marked excess among females. The month of greatest incidence for scarlet fever is usually January, the minimum incidence in July or August in all but three years out of 40. No evidence of periodicity in the incidence could be found in the Providence figures.

Among 22,000 cases of scarlet fever, 271 were recorded as second attacks. Dr. Pope believes this to be an under-estimate of the percentage of recurrence of scarlet fever in the individual, although the fact that only one-seventh as many cases were recorded among those who previously had the disease as among the general population shows that one attack does confer a relative immunity. A marked preponderance of females in the higher age-groups among recurrences is evidence that infection with scarlet fever depends to a great extent upon intimacy of contact.

A recent U.S. Public Health Report (Vol. XLI., No. 24), gives the results of Dick tests made on different groups of school-children in Fairfax county and in Washington. The groups of rural and suburban school-children were found to give a higher percentage of positive reactions than did the children in city institutions. A similar result was found in the case of children who had already suffered from scarlet fever, the difference being explained either by a difference in degree and frequency of exposure in city and rural children, or by the suggestion that different strains of scarlet fever streptococci may produce different toxins. A relatively greater immunity was found to exist in males than in females, this difference being found to increase with age. When two or more children from one family were tested there was a tendency for the reactions on the different children to agree. When disagreement occurred, the younger children were more often positive and the older children more often negative.

GENERAL PRACTITIONER SERVICE.

ITS RANGE UNDER THE INSURANCE ACTS.

THE insurance medical service is at the present time, as Sir George Newman writes in his Report,[1] a service of general medical practitioners. Each practitioner, by his agreement with the insurance committee, has contracted to give to his insured patients "all proper and necessary medical services other than those involving the application of special skill and experience of a degree or kind which general practitioners as a class cannot reasonably be expected to possess," and it is provided in the terms of service for practitioners that in "determining whether a particular service is a service involving the application of such special skill and experience as aforesaid, regard is to be had to the question whether services of the kind are or are not usually undertaken by general practitioners practising in the area in which the question arose."

The medical benefit regulations lay down a procedure for determining whether a given service falls within the content of medical benefit. If a practitioner thinks that a service which he has either already performed, or is about to perform, is outside the scope of his obligations, he is required to supply the insurance committee with particulars of the service on a form furnished by the committee. The form is then sent to the local medical committee, who are asked to state whether in their opinion the service as described by the practitioner is one that involved "the application of special skill and experience of a degree or kind which general practitioners as a class cannot reasonably be expected to possess." In the regulations operative prior to 1924 the question was formulated as to whether the service was one which "could consistently with the best interests of the patient be properly undertaken by a general practitioner of ordinary professional competence and skill." The opinion of the local medical committee is considered by the insurance committee, and if the two committees fail to agree the matter must be referred by the Ministry of Health to referees, whose decision is final. If the two committees agree the Ministry may, in the exercise of its discretion, refer the matter to referees. The regulations require that the referees, who are nominated by the Ministry, shall be two medical practitioners and one barrister-at-law or solicitor in actual practice, and they have power to determine their own procedure.

Many cases have arisen for decision and lists of the rulings given since 1920 were set out in Vol. III. of the Reports of Inquiries and Appeals under the N.H.I. Medical Benefit Regulations,[2] and may be summarised here.

Some Cases not Referred to Referees.

In the following instances the local medical and insurance committees held that in the particular circumstances the operation or other service *was* of a kind which could properly be undertaken by a general practitioner of ordinary professional competence and skill.

(1) Treatment of fracture of both bones of leg and dislocation of ankle.
(2) Treatment of gonorrhœa by irrigation and medicine.
(3) Opening and scraping abscess of thigh.
(4) Curetting of uterus.
(5) Suppurative mastitis: opening and breaking down all pockets and inserting rubber drainage-tubes.
(6) Opening and draining an ischio-rectal abscess.
(7) Advanced cirrhosis of liver with very severe ascites and general dropsy; local anæsthetic injected. Incision made; cannula and trocar inserted; drainage-tube fitted to cannula.
(8) Operation for fissure in ano.
(9) Removal of facial sebaceous cyst.
(10) Deep abscess of neck due to liquefaction of glands; incision made, sinus forceps inserted and creamy material evacuated. Syringed out with iodine.
(11) Dislocation of left elbow; reduction under chloroform.
(12) Ophthalmoscopic examination for occipital headache.
(13) Removal of epithelioma of lower lip.

In another group of cases the committees agreed that in the particular circumstances the operation or other service *was not* of a kind which could properly be undertaken by a general practitioner of ordinary professional competence and skill.

(1) Removal by dissection of Bartholin's gland.
(2) Passage of Eustachian catheter.
(3) Operation for hæmorrhoids.
(4) Examination of eyes by retinoscopy.
(5) Colpo-perineorrhaphy and stitching the cervix.
(6) Gastro-jejunostomy.
(7) Removal of varicose veins.
(8) Intravenous administration of novarsenobillon.
(9) Enucleation of eyeball.
(10) Radical cure of left inguinal hernia.
(11) Operation for suppurating fibroid with local pelvic peritonitis.
(12) Removal of tuberculous glands in neck.
(13) Extreme genu valgum in both legs—osteotomy of femora.
(14) Excision of multiple fistulæ in ano (horseshoe variety).
(15) Removal of internal semilunar cartilage of left knee.
(16) X ray treatment for recurrent carcinoma of axillary glands.
(17) Application of radiant heat and ionisation.
(18) Complete tonsillectomy—curetting nasopharynx.
(19) Removal of large sebaceous cyst from right side of neck.

[1] On the State of the Public Health: Annual Report of the Chief Medical Officer of the Ministry of Health for 1925. H.M. Stationery Office. 3s.

[2] H.M. Stationery Office. 1924. 3s.

(20) Dissecting out cyst over mastoid.
(21) Removal of epithelioma of axilla.
(22) Cauterisation of nose and tonsillectomy.
(23) Excision of hypertrophied turbinate bones in nose and excision of tonsils and adenoids.
(24) Excising and suturing bladder sinus.
(25) Peritomy.
(26) Resection of intestine. (Paul's operation.)
(27) Amputation of toes.
(28) Removal of appendix.
(29) Removal of nasal polypi.
(30) Operation for chronic gastric ulcer—carcinomatous.
(31) General anæsthetic for tonsillectomy and gastric enterostomy.

Some Cases Referred to Referees.

Other cases were referred to referees, and the decision on those in Group I. was that, in the particular circumstances, the service was one which could consistently with the best interests of the patient properly be undertaken by a general practitioner of ordinary professional competence and skill, while in the cases included in Group II. the decision was to the contrary effect.

Group I.

(1) Removal of fibroma-adenoma of breast.
(2) Removal of needle from foot.
(3) Operation for cellulitis.
(4) Removal of papillomatous tumour from back.
(5) Removal of cyst from neighbourhood of knee-joint.
(6) Taking blood (venous) as a preliminary to the Wassermann test for syphilis.

Group II.

(1) Removal of thrombosed and varicose veins in leg.
(2) Operation for atresia oris uteri interni with retroflexion.
(3) Amputation of arm below elbow.
(4) Removal of epulis from between teeth.
(5) Removal of polypus from rectum.
(6) Operation for hæmorrhoids.

Special Skill and Experience.

When an insurance practitioner has actually performed an operation or other service which he contends is outside his insurance obligation on the ground that it involved the application of special skill and experience of a degree or kind which general practitioners as a class cannot reasonably be expected to possess, the onus is thrown upon him to establish that he himself does possess such special skill and experience. By his contention he implicitly states that his professional colleagues in the area as a class do not possess the special skill and experience which he claims that he does possess, and before his claim can be admitted the regulations provide that he must prove:—

(*a*) that he has held hospital or other appointments affording special opportunities for acquiring special skill and experience of the kind required for the performance of the service rendered, and has had actual recent practice in performing the service rendered or services of a similar character, or

(*b*) that he has had special academic or post-graduate study of a subject which comprises the service rendered, and has had actual recent practice as aforesaid, or

(*c*) that he is generally recognised by other practitioners in the area as having special proficiency and experience in a subject which comprises the service rendered.

The question of determining the range of the insurance practitioner's obligations is one of great importance. If the performance of a certain operation is held to be not one of those services which the practitioner has, in virtue of his agreement with the insurance committee, contracted to render when necessary to his insured patients, he is entitled to charge the patient a fee for the service. The question, therefore, is one that affects the statutory rights of the insured population, and it was obviously necessary that a procedure should be devised for dealing fairly, effectively, and expeditiously with cases in which it is doubted whether a given service is or is not within the scope of a practitioner's insurance obligation. The procedure described in the preceding paragraphs has been in operation for the past 13 years, and Sir George Newman considers that it has stood the test of time. "I think it is true to say," he adds, "that insurance practitioners as a body are not disposed to take a narrow view of the range of their obligations, and it is known that there are practitioners who habitually and without charge render to their insured patients services which, if the question were raised, would probably be held to be outside the scope of medical benefit."

SMOKE ABATEMENT AND HEALTH: CONFERENCE AND EXHIBITION.

BIRMINGHAM, SEPT. 6TH–18TH.

BOTH the householder and the manufacturer who visit the Smoke Abatement Exhibition, which is drawing to a close, at the Bingley Hall, Birmingham, can find there a very practical display of all the principal established methods of efficiently abating smoke. There is little that is new except in detail, save for a development in the design of a domestic grate constructed for burning gas coke. At the Conference of the Smoke Abatement League of Great Britain held in connexion with the exhibition last week, it was generally accepted that, whatever the future may hold in store, the only existing solid smokeless fuel suitable for domestic use and available in considerable quantities is the coke produced from gas-works. Nevertheless, gas coke has admitted drawbacks; as Dr. Margaret Fishenden, of the Fuel Research Board, remarked in a paper on the Outlook for Smokeless Domestic Heating, difficulty of ignition and relatively low combustibility have tended to make coke unpopular with the housewife. These disadvantages are due partly to the low volatile content of gas coke and partly to its inherent physical characteristics; "but they are frequently accentuated," she added, "by the presence of large amounts of moisture and ash and by the practice of selling coke ungraded—i.e., not separated according to size." The future use of coke for open fires depends therefore partly upon improved production and grading, improvements to which gas undertakings have of late given much more attention. But the type of grate in which it is consumed can also assist by making ignition and combustion easier and by reducing the amount of ash liable to be sent into the room. It is in these respects that the new "Glow-Worm" open coke fire, designed by Dr. J. S. Owens, is important and worth describing fully.

A Practical Open Coke Fire Grate.

In ordinary open fires the combustion of the fuel is from bottom to top. Ash is formed and needs to drop downwards into the ash-pan, but the air for combustion rising up through the fuel tends to keep the ash in the fire, and when the fire is poked throws the fine ash out into the room. With the "Glow-Worm" fire combustion is from back to front through a wedge-shaped fire-basket. Ash in falling is carried through into the ash-pan, and however vigorously the fire may be poked, no ash or dust comes out into the room. To promote the fullest possible amount of radiant heat the ash-pan is pushed backward, when the whole of the fire exposed to view will become a glowing incandescent mass. The addition of new fuel does not obscure the pleasing appearance of this incandescent fuel or in any way interfere with the amount of radiant heat sent out into the room. By pulling the ash-pan forward a certain amount of air instead of passing through the fire will go under the fire and up the flue; in addition to which air constantly passes under the canopy of the fire and thereby ventilates the room. As the flue at the back of the stove terminates at a point higher than the mouth of the canopy, a true injector effect takes place. The fire itself has been constructed with a tapered back so that it will partly fit into the average existing coal grate. In this way, the projection into the hearth is reduced to the minimum and a pleasing appearance is obtained. The consumption of coke is from 1 to 1½ lb. per hour, and the cost, therefore, of

using this fire is considerably less than the average coal fire with its attendant dust and trouble. There is no need at any time to lift out the remainder of the previous day's fuel. Fresh fuel can be added on top of the cinders at the bottom of the grate, and ignition is rendered simple and quick by the provision of a gas-lighter.

Ventilation and Heating.

The papers and discussions at the Conference, like the stands at the exhibition, mainly retold what was already known—not indeed to the bulk of fuel-users, but to the scientists and experts. Sir John Robertson and Dr. Leonard Hill dealt effectively with the value of sunlight and with ventilation and heating, and both argued strongly that there is no justification for the continued use of raw coal on its present enormous scale. In Dr. Hill's words it is bad policy to "put off the demand for abolition of smoke pollution on the plea of waiting for the economic production of a smokeless fuel better than coke and gas. The modern gas fire has been perfected so as to give a maximum of radiant energy including visible red rays which penetrate the skin and the tissues to some depth." It was also, he said, a fairly efficient ventilator, especially where a second opening into the flue was provided, as in the best designs, so as to raise the total ventilation of a small shut-up room to some 3000 cubic feet an hour. But the radiant energy of a gas fire, he added, is so great that a window can and should always be kept open. He laid considerable stress on the error both of overheating, a common mistake in using gas fires, and of monotonous heating; there was a definite advantage in the variations in the heat emitted by coal fires, and though this could be easily obtained with gas, people tended to make too little use of the control which the gas taps afforded.

Dr. J. S. Owens underlined the emphasis laid on ventilation. In estimating the "efficiency" of heating appliances, the function of the appliance must be clearly understood; you cannot, he said, relate input to output unless you know what sort of output you want. It so happens that ventilation is a function generally left to heating appliances; and it is misleading to talk of an appliance being highly efficient when it fulfils the heating function only. There was also good sense in Dr. Owens's point that it is not necessarily sound to be always seeking to render new fuels suitable for use in appliances designed for some other fuel; it may be better policy to adapt appliances to fuels than fuels to appliances.

The Domestic Chimney.

Much light on the practicability of domestic smoke abatement was supplied in a paper on Municipal Housing Schemes by Mr. E. D. Simon and Miss M. FitzGerald. The Smoke Abatement League circulated to local authorities a questionnaire designed to elicit what steps, if any, they had taken to reduce or abolish smoke from their own houses, and what were the results in the opinion of both authority and tenants. The answers, summarised in the paper, clearly showed that domestic smoke abatement was practically a new idea to some authorities. In a very fair number of housing schemes, however, provision had been made for smokeless heating and cooking with the exception of one coal fire, and in some cases all-gas and all-electric houses had been tried. After making allowance for the natural dislike of change, even for the better, the evidence justified the conclusion that a far wider use of smokeless methods would be acceptable and economic even in houses occupied by people of limited means. The Conference endorsed the view that the Government in its Smoke Abatement Bill was quite needlessly overcautious in refusing to deal with the domestic chimney. A purely permissive clause was required, enabling local authorities to make regulations with regard to cooking and heating arrangements in *new* dwelling-houses, with a view to reducing smoke.

Mr. Raymond Unwin and Mr. Pointon Taylor, Chief Architect and Chief Assistant Architect respectively to the Ministry of Health, while defending the Government's caution, set forth in their paper on "Clean Air and Clean Houses" the possibilities of smoke abatement in an encouraging way which seemed hardly consistent.

Further Steps.

Papers were also contributed on the subject of industrial smoke, and a preliminary step was taken to bring about the formation of voluntary associations of manufacturers to study in coöperation and apply individually means of eliminating the inefficiency and waste which their present smoke production represents. A more comprehensive suggestion was also thrown out that the delay between the admitted establishment of economic remedies for smoke and their adoption by domestic and industrial fuel-users might be reduced if a national smoke abatement movement were brought into being, embracing all the smoke abatement efforts now carried on too much in isolation. At any rate the Conference made clear the slowness with which people put into practice even smokeless methods that are known to pay, apart from their value as such.

Attendance at the exhibition has been disappointingly small. But at present it is not apparent whence the funds are to be drawn for a campaign on a scale which would attract adequate notice.

MEDICINE AND THE LAW.

Hospital Collection Frauds.

MENTION was made in this column a few weeks ago of sentences passed upon a group of defendants who had been conspiring to obtain charitable contributions by fraud. Their method was to represent themselves as an organisation engaged in collecting money in aid of hospitals, and they obtained considerable sums from audiences at cinematograph theatres, being sometimes allowed to address the audiences from the stage. An associate of these defendants pleaded "Guilty" on Sept. 8th at the Central Criminal Court to a charge of conspiring to obtain charitable contributions by fraud, and was sentenced to nine months imprisonment in the second division. He would have been tried and sentenced with the defendants in the previous proceedings had he not disappeared while on bail awaiting trial. In a country where the hospitals rely so largely upon voluntary subscriptions this particularly mean fraud seems to require specially vigorous measures. It is perhaps hopeless to expect the charitable public, though often imposed upon, to examine the credentials of every person who invites contributions for charitable objects. But a great deal can be done by local, if not general, restrictions upon the abuse of flag-days, and upon unauthorised collection in places of public resort. By-laws should be elaborated, if necessary, and every locality should see that its inhabitants are protected. The bench will no doubt bear in mind, too, the desirability of passing exemplary sentences.

Poisoning Cases: Immediate Treatment at Hospitals.

There are few practitioners who have not had experience of the manifestations of disappointment of persons who wish for the immediate treatment of a patient at a juncture when every moment of professional time is already occupied with the treatment of others. The same disappointment must often occur where a hospital is asked to give facilities or accommodation when neither are available. At an inquest on Sept. 10th the Hackney coroner (Dr. Edwin Smith) commented adversely upon the action of a doctor at the German Hospital at Dalston, who had omitted to treat a woman suffering from lysol poisoning. The woman was found lying unconscious upon the floor of her kitchen, having apparently swallowed poison. She was taken to the German Hospital, but, as no bed was available, she was removed to the Metropolitan Hospital, where she died an hour later. The coroner's point was that

first-aid should have been rendered, and that for this purpose it was unnecessary to wait till the patient could be put to bed. The resident at the German Hospital was asked if he did not think it would have been better to have gone down and looked at the patient before sending her away to another hospital. He did not agree; he said it would have taken some time to administer treatment and he was not in a position to admit her to his hospital. It appeared from his further evidence that the German Hospital was not equipped with a poison cupboard with stomach-pumps, antidotes, and emetics in readiness for prompt use, and that it would have taken time to collect apparatus and drugs. The coroner in recording a verdict of "Suicide while of unsound mind" took the view that while treatment would not have saved life in this instance, the hospital should have been prepared to meet such an emergency. We note that in the Medical Directory this hospital is discribed as "for.....all cases of emergency."

Patient Declining to Remain in Hospital.

An incident of a converse character, occurring on the same day, illustrates the reluctance of some patients to be admitted to hospital. A woman was knocked down by a motor-car and was taken in an ambulance to St. George's Hospital. There she was examined by a doctor who advised her to remain. She declined to remain and signed a document to the effect that she had left of her own accord and contrary to the doctor's advice. Five days later she was found dead at her flat. The post-mortem examination showed that the deceased, a woman of 60, had a fissured fracture at the base of the skull, a fracture of such a nature that it could hardly be diagnosed during life. She had also four ribs fractured. The divisional police surgeon, Dr. Percy J. Edmunds, giving evidence in the Westminster coroner's court, expressed the opinion that the deceased had lain in bed for some time, but that, owing to the gradual oozing of blood in the brain, she had begun to feel faint and probably got up to summon assistance when she fell and died. The coroner's jury returned a verdict of "Accidental death."

BERLIN.

(FROM OUR OWN CORRESPONDENT.)

Epidemic of Gastro-intestinal Catarrh.

IN certain districts of the city of Hanover an epidemic of gastro-intestinal catarrh has occurred, fortunately without fatal issue up to the time of writing.[1] It has been ascertained by the Hygienic Institute of Hanover that the cause of the disease was a contamination of the drinking water. Although the organisms of enteric fever, dysentery or cholera were not present, the percentage of germs in the water from one of the waterworks was found to have considerably increased. The epidemic, which had affected a large number of the people in the district which is supplied from this source, has now been stamped out, and officials of the Health Office state that the water is now safe for drinking purposes without being boiled. They are of opinion that the inundations of this summer had caused germs from the surface of the soil to penetrate into the deeper strata whence the water is derived; moreover, a deficiency in the drains due to the floods had allowed the waste water from a tar factory to find its way to the water-works.

Birth-rate in Germany and in France.

At a recent meeting of the Berlin Society for Public Health the birth-rate in Germany was discussed by Prof. Grotjahn. He stated that formerly the birth-rate had exceeded the number of deaths, so that the population showed a constant increase and Germany became overcrowded. This state of things has changed during the last 20 years. At present the number of deaths is certainly smaller than that of the births; this is, however, attributed to the fact that during the war so many people were killed, and immediately afterwards, during the inflation, underfeeding caused the premature death of others. Now that normal conditions have been restored, the death-rate is expected to show an increase, whilst the birth-rate will diminish. The decrease of the birth-rate is believed to be due to the indiscriminate use of contraceptive drugs and appliances, a factor common to all nations of the West; in Slavonic countries an enormous number of births still take place. By statistical researches it has been ascertained that to maintain the number of the population—not to increase it—there must be three children for every marriage, and as every marriage cannot produce that number there must naturally be families with more children. In France there is a law according to which families of small financial means receive support from the municipality on behalf of every child born after the second. They moreover enjoy other privileges. Germany has done nothing in this direction. Prof. Grotjahn pointed out that it is erroneous to believe that the decrease of the birth-rate is a remedy for unemployment. The example of France shows, on the contrary, that the decrease of the birth-rate in a country induces foreign workmen to come to seek work there. The state of things in Germany is the more undesirable, as in France the decrease of births has been nearly stopped for several years, whilst in Germany it is still growing steadily. In Germany, in 1900, 35 births were registered for each 1000 inhabitants; in 1924, only 20·4. In France the birth-rate was only 21·3 in 1900; but scarcely less—19·3—in 1924. The speaker (Prof. Grotjahn) advised the Government to adopt and to improve upon the French system of support of families having many children.

Articles in the Medical Press.

Seventy-eight editors of German medical periodicals, including the leading medical journals, have collectively approached the heads of university clinics and other scientific institutions, asking them to insist on the reduction to a reasonable size of articles submitted for publication by their assistants. They state that they can no longer afford to give as much space as before the war to lengthy communications, and point out that when the MSS. for publication are shortened in the editorial office undesirable controversy may ensue. Heads of clinics and scientific institutes are therefore asked to use their authority in supervising articles issued by their juniors, and to induce them to submit MSS. in a more concentrated form. Articles of minor importance, when too long, must inevitably be refused. The editors point out that this step has been taken only in the interest of maintaining the high standard of their journals.

Statistics of Hospitals in Prussia.

In 1924 the number of hospitals, clinics, and infirmaries in Prussia was 2195, of which 1816 were public institutions. The number of institutions has decreased by 134 since 1913, but the number of beds has increased, being 205,516, against 177,184 in 1913. For each 10,000 inhabitants 54·9 beds are now available, against 42·5 before the war. The number of hospital patients in 1924 was 1,606,178, against 1,534,209 in 1913. Of these 88,836 died, giving a death-rate of 5·5 per cent., against a death-rate of 6·1 in 1923 and 5·6 in 1913. The relation of the deaths in hospital to the general death-rate was, in 1924, 193·5 to 10,000; in 1921, 177·8, and in 1913, only 136·7. This relative increase of the deaths in hospital is ascribed to the fact that membership to a sick club which has to cover the expenses of a hospital stay having become compulsory for a much greater percentage of the population, in consequence many more patients than formerly are conveyed to hospital when ill.

[1] Fatal cases have since been reported in the press, in which the outbreak has generally been described as one of typhoid fever.—ED. L.

Public Health Services.

REPORTS OF MEDICAL OFFICERS OF HEALTH.

THE following are some of the health statistics of three English and two Scottish counties (landward areas) for 1925 :—

Name of county.	Estimated mid-year population (R.G.).	Birth-rate.	Death-rates per 1000 of the population.					Death-rates per 1000 births.	
			All causes.	Tuberculosis.	Cancer.	Resp. diseases with influenza.	Heart disease.	Infant mortality.	Maternal mort. from childbirth.
Warwickshire ..	361,700	18·5	11·1	0·91	1·31	2·0	1·5	62	5·1
Hertfordshire ..	346,600	15·8	10·4	0·84	1·49	1·7	1·6	47	3·3
Northamptonshire ..	215,300	16·2	11·7	0·97	1·44	1·7	1·6	57	3·2
Dunbartonshire ..	54,449	19·3	12·3	0·88	1·49	2·0	1·7	72	4·7
Roxburghshire ..	19,819	15·7	14·1	0·85*	1·61	2·3	2·7	60	9·6

* Average for 3 years 1923–25, including burghal area.

Warwickshire.

Dr. A. Hamilton Wood reports that the infant death-rate of 56 in the urban districts compares very favourably with the 66 recorded in the rural districts. There were 22 deaths from diarrhœa in the rural as compared with only 4 in the urban, which may be the result of the better facilities in the urban districts for infant welfare work. The population of the urban district is 157,500, and of the rural 204,200. Sixty-seven cases of small-pox were notified in the county with no deaths. Diphtheria, unlike scarlet fever, maintains its position as a fatal infectious disease. The case fatality among the 542 cases notified in 1925 was 6·4 per cent. Dr. Wood is of opinion that this case-rate would be reduced if the early administration of antitoxin were more generally adopted. The public also need to be educated to seek medical advice early in all cases of sore-throat when diphtheria is known to be present in the district. Of the 8 cases of enteric fever notified 4 were of the mild or paratyphoid type. Two deaths occurred in males of 25 and 45 years respectively. There were 46 notifications of encephalitis lethargica with 26 deaths. Dr. Wood thinks that several adjoining counties should combine to establish an institution for the treatment of the survivors from this disease. There was a widespread epidemic of influenza in the first quarter of the year, which led to the closure of 114 schools; the deaths numbered 138.

After a conference with all the local authorities in the county it was decided that the County Council should administer the Milk Act of 1915, and the veterinary surgeons under the Diseases of Animals Acts have been appointed for this purpose. The examination of milk for tubercle was only just begun at the close of the year. During the current financial year the Council has authorised the examination of 50 samples for tubercle bacilli, which does not seem a large number. The treatment of pulmonary tuberculosis by sanocrysin was begun at the Memorial Sanatorium during the summer. So far the results are encouraging. The County Council have issued instructions with regard to the examination of diphtheria swabs which are expected to effect an economy without interfering with efficiency. Convalescents are only to be swabbed if there are clinical signs. Convalescents are not to be readmitted to school until two or three weeks after the end of the illness on the certificate of the district medical officer. Virulence tests will only be carried out on the authority of the county medical officer of health. Swabs among contacts are only to be taken from those showing clinical signs. Emphasis is laid on the dictum of the Medical Research Council that the diagnosis of diphtheria is the province of the clinician, who cannot place any of the responsibility on the shoulders of the bacteriologist.

Dr. Wood is impressed with the small number of women who present themselves for treatment at the V.D. centres, and he is convinced that the only solution is treatment in the doctor's private surgery. At the five V.D. centres only 40 new female cases were treated, as against 162 men. The grant previously made by the County Council to the nursing associations for the training of midwives is to be modified so as to become a grant towards the appointment of midwives to work in the county. The new cases who attended at the four antenatal clinics during 1925 numbered only 218, while the total births were 6677. The midwives attended 4890 births and sent for medical help in 885 cases. Arrangements have been made during the year for the orthopædic treatment of children under 5 years of age at the Dunsmoor Clinic, Coventry, maintained by the Coventry Cripples' Guild. There are now 34 infant welfare centres, all run by voluntary committees working in close association with the County Council. The two county maternity homes have fulfilled a much-felt want, as there are still many young married couples who have to live in rooms. The Rugby Home admitted 89 cases and the Warwick Home 34, and, in addition, 108 extern cases were attended by the midwives of the Warwick Home. Of the 30 cases of ophthalmia notified, one resulted in total blindness and another in impaired vision.

Hertfordshire.

Dr. H. Hyslop Thomson gives particulars of the home conditions of 389 patients suffering from tuberculosis. The conditions are described as good in 60·5 per cent., indifferent in 28·6 per cent., and bad in 10·9 per cent. In the case of 68 per cent. there were 2 or less persons per bedroom, in 21·7 per cent. there were 3 persons, in 8·5 per cent. 4, and in 1·8 per cent. over 4.

The conditions of the ex-Service men come out best, of the insured persons second best, and of the uninsured worst. The information obtained "indicates the existence of overcrowding and emphasises the urgent need for the provision of additional houses." There is an absence of adequate accommodation in certified institutions, more especially for low grade and complicated cases of mental defect. The difficulties met with show the importance and urgency of the steps which have been taken to provide a certified institution and training colony. There were 15 notifications of encephalitis lethargica, 14 being from the urban districts. Of the 9 deaths 8 occurred in the urban districts. The chief advance made during the year in the maternity and child welfare scheme had been the establishment of 4 antenatal clinics, which were attended by 269 expectant mothers, the number of births in the administrative county being 5481.

Maternal deaths from puerperal sepsis continue at about the same level. In Hertfordshire Dr. Thomson suggests that the condition is due to auto-infection rather than to infection introduced from without. Inquiries with regard to the feeding of infants indicate that at the age of 6 months 66 per cent. are entirely breast-fed, 17 per cent. are partly breast-fed, and 17 per cent. entirely bottle-fed. The report of Miss Harrington, the county health visitor, inspector of midwives and superintendent of nurses, shows that 2699 of the births were attended by midwives alone, almost exactly half the total births. It is further stated that among the births attended by midwives alone only 15 of the infants died before the tenth day. The Registrar-General's report shows 94 infantile

deaths in the county within the first week. If the information on which Miss Harrington's statements are founded is complete, it follows that the proportion of deaths was five or six times higher in the remaining cases.

In previous reports Dr. Thomson has complained of the dumping of house refuse in the county by outside authorities. He now reports that since the precautions suggested by the Ministry of Health have been carried out the objectionable features of these refuse dumps have been considerably lessened, and that the covering of railway wagons conveying refuse has also improved matters. The regulations for the grading of milk are cited, and also the provisions of the new Milk Act and of the Tuberculosis Order of 1925, but it is not stated that any action has been taken with respect to these measures. The state of the private slaughter-houses in the county is still far from satisfactory, and there is need for the erection of central abattoirs. Thirteen samples of apples were examined for arsenic, 4 were free, 7 showed traces negligible in amount, while in the case of 2 the amounts of arsenic were 1/50 and 1/60 of a grain respectively per lb. of apples.

Northamptonshire.

Dr. L. Meredith Davies acknowledges the help of his predecessor, Dr. Paget (who resigned on March 21st, 1926), in the preparation of the report. In November, 1918, Dr. Paget reported on the question of maternity hospital provision. In July, 1922, a maternity home was opened in the borough of Northampton, which was partially subsidised by the County Council. During 1925 the whole subject of maternal mortality was further considered in conjunction with a special committee of the medical profession in the county. The medical delegates expressed themselves as in favour of the establishment of antenatal clinics and hospitals for complicated maternity cases on condition that the services of a specialist obstetrician and gynæcologist were available at such clinics and hospitals. It was decided to approach the boards of the Northampton and Kettering general hospitals. As regards the carrying out of the new milk legislation, it has been decided that samples shall be taken by the inspectors appointed under the Food and Drugs Act, that the veterinary work shall be done by the inspectors appointed under the Diseases of Animals Acts, and that arrangements be made, if possible, with the Northampton General Hospital for the necessary bacteriological work. There were 17 cases of ophthalmia neonatorum, 13 notified and 4 unnotified. In 2 cases there were opacities, one of the left eye and one of both eyes, and an operation was necessary in both cases to secure any vision. Both of these were doctor's cases and unattended by midwives in any capacity. There were 13 cases of puerperal fever with 5 deaths, 1 being a midwife's case, 2 being attended by midwives as monthly nurses, and 2 unattended by midwives in any capacity. In spite of reminders issued for two years in succession, the midwives do not always notify cases of artificial feeding. During 1925 29 of these cases were unnotified, and Dr. Davies thinks that the reasons for abandoning natural feeding are frequently not valid.

Five patients suffering from lupus were treated at the out-patient department of the London Hospital by Finsen light and arc light baths. Three were cured and two were under treatment at the end of the year. 187 cases of small-pox were notified with 2 deaths. An advance was marked in 1925 as regards the erection of dwellings by private enterprise; 511 were completed as compared with 366 in the previous year. There were also 223 in course of erection at the close of the year. The houses erected by local authorities numbered 106, as compared with 89 in 1924, and, in addition, there were 216 houses in course of erection. During the years 1921–25 1634 houses were completed by local authorities and 1279 by private enterprise. During the same period closing or demolition orders were made in respect of 125 houses. The county analyst, Mr. E. W. Voelcker, reports that under the food orders of 1919 shredded suet had to contain at least 80 per cent. of fat, and that now in some cases over 30 per cent. of rice-flour is added, the fat being less than 65 per cent. He thinks this excessive amount of "diluent" should be controlled by law.

Dunbartonshire.

Dr. Thomas Lauder Thomson reports that in March, 1925, an arrangement was made with the Glasgow Corporation whereby tuberculous "suspects" could be examined by X rays at Ruchill Hospital. Of the 22 cases examined, 4 were positive, 1 doubtful, and 10 negative. Four were referred to the tuberculosis officer, and in 3 the examination was repeated. Although these examinations do not give conclusive results in all cases, Dr. Thomson thinks they are valuable as confirmation in doubtful cases. Most of the farmers are doing their best to carry out the by-laws framed for securing better accommodation for seasonal workers. A milk vendor was fined during the year for breach of the Milk and Dairies (Amendment) Act, 1922. He was selling milk from a barrow in one of the populous areas in the county, and the barrow had inscribed on it "Milk free from tuberculuous," and in large letters "Smith's pasteurised milk." There was also a picture of a churn with "Grade A" printed on it. This vendor had no licence for any grade of milk and disregarded warnings. The school clinics have been opened for all children irrespective of age, and this enables children to be sent from the child welfare centres for the treatment of diseases of the ear, nose, throat, eyes, and teeth, and also for the treatment of ringworm. The fever hospital service has been improved by coöperative arrangements between the three hospitals, so that if one hospital becomes overcrowded patients can be transferred to another.

Roxburghshire.

Dr. M. J. Oliver shows that when the last two quinquennia are compared the infant mortality-rate has been reduced from 81 to 65. This reduction would no doubt have been attributed to a welfare scheme if the county had had one; some of the credit Dr. Oliver assigns to the local nursing association. During the year a known typhoid carrier died in Kelso Hospital. Since she was first ill in Northumberland in October, 1913, she had been the cause of 11 cases of typhoid fever in Roxburghshire. The Kelso district committee did their best to protect the community without undue hardship to the sufferer by providing her a home with necessary conveniences at the public cost; but, in spite of this, infection was more than once communicated to other people. She underwent an operation in Glasgow in 1923 for the purpose of getting rid of the infection. The operation was apparently successful, but she died from an intercurrent affection during the long course of bacteriological testing needed to make sure that she was free from infection. Dr. Oliver records that a few more cases of puerperal fever have been notified than usual, but that this probably does not indicate any real increase in numbers. Many medical practitioners find a difficulty in determining what cases should be notified under this "antiquated term." Cases notified are generally in the practices of senior members of the profession whose reputation can stand the possible imputation.

Dr. G. F. B. Page, in reporting on the tuberculosis scheme, says we must dispose of the time-worn myth, "the light job in the open-air." No such job exists at a living wage. It is best for the patient to return to his original work unless it is one of half a dozen intrinsically unhealthy occupations. Dr. Page thinks that we ought to realise that light treatment of tuberculosis is in an experimental stage and that harm may be done by its injudicious use. The forms of tuberculosis which benefit most are those of exudative type.

Correspondence.

"Audi alteram partem."

THE STUDY OF DEATH IN MAN.

To the Editor of THE LANCET.

SIR,—In order to encourage a systematic and scientific study of the dying hour, I would suggest that medical societies pass some such resolution as :—

Resolved : That the Medical Society of the ..... favours the scientific and systematic study of the physiology and psychology of death in man, and requests its members to make such studies in every case of death when there is opportunity.

It is a curious fact that as yet there seems to have been no systematic and scientific study of human death. There have been more or less sporadic efforts to make such investigations in exceptional and interesting pathological cases. But the regular order, so to speak, or the average manner of death is not known. Some of the main reasons for such study are :—

1. To gain trustworthy and general knowledge of what most often takes place in the dying hour, including details.
2. To learn the manner of death for different diseases and the per cent. of those conscious and unconscious.
3. To find in what per cent. of cases there is severe pain, slight pain, and no pain.
4. To note details in exceptional and special cases and the causes of these phenomena and the length of dying time.
5. To determine the characteristics and differences in dying between infants, children, adolescents, adults before middle life, during middle life, in old age, and from 80 to 100 years of age, including points under numbers 2, 3, and 4 for their ages.
6. To present eventually a general picture of the dying time, based upon a sufficient number of observations, and with instruments of precision when possible.
7. That with such knowledge the treatment of patients during the dying time may be more humane and delicately done.
8. That in cases that are liable to be painful, proper precautions may be taken in advance, so that pain may be avoided or greatly lessened.
9. That finally the knowledge of the dying time may be so increased that physical death will cease to be feared or dreaded by all persons, since through such knowledge pain may be practically eliminated and death may be made easy, gentle, and placid.

I am myself seeking opportunity to make observation on cases of death, and I would consider it a great favour if any physician who makes observations and studies of cases during the dying time will send me a copy of his notes and results, for which due credit will be given when sufficient data are received to justify publication.

I am, Sir, yours faithfully,
(Dr.) ARTHUR MACDONALD,

The Congressional Apartments, 100 E. Capitol-street, Washington, D.C.

CHENOPODIUM FOR ANKYLOSTOMIASIS.

To the Editor of THE LANCET.

SIR,—Mr. Paget's recent paper on the determination of the ascaridol content of oil of chenopodium, to which Messrs. Burroughs Wellcome and Co. call courteous attention in your issue of Sept. 4th, shows that the constants laid down for that oil in the U.S.P. are valueless unless the oil is a genuine one, since they can be reproduced by skilful adulteration ; and, moreover, that the means advised in that Pharmacopœia for determining the ascaridol content are not effective in such an adulterated oil. With a genuine oil, however, the old methods of estimating ascaridol, especially the specific gravity test, are shown to be fairly or actually accurate. Accordingly if one may assume, as seems reasonable, that the bulk of the oil used generally in anthelmintic work has been genuine, the findings of Mr. Paget's careful investigation authorise little misgiving in the continued use of the mass of information which has been accumulated in the tropics on the administration and effects of oil of chenopodium.

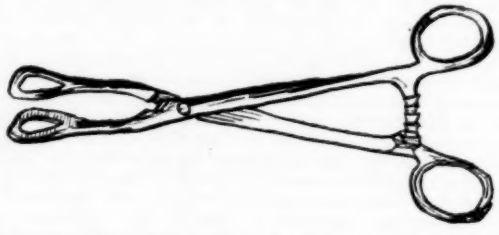
The letter under consideration raises a second point of equal practical importance. Burroughs Wellcome and Co. have produced an oil of chenopodium having an ascaridol content of 90 per cent. and upwards. In 1·2 c.cm. of this oil there is as much ascaridol as in about 1·8 c.cm. of an ordinary sample. Put otherwise, to give 1·2 c.cm. of this preparation is equivalent to giving 1·8 c.cm. of an ordinary sample, while a dose of 1·5 c.cm. is equivalent to 2·25 c.cm. In order to administer the ordinary dose of ascaridol, the dose of this particular oil must be only 0·8 c.cm., a vital matter seeing how slight must sometimes be the margin between safety and anxiety in the case of ascaridol, equally with that of the other anthelmintics of which we have present knowledge.

I am, Sir, yours faithfully,
Ealing, W., Sept. 10th, 1926. CLAYTON LANE.

A PLEA FOR THE PERMANENT ABOLISHMENT OF THE "LINGUOTRITE."

To the Editor of THE LANCET.

SIR,—The "linguotrite," or tongue-crusher, is a brutal instrument which is still far too frequently found in the anæsthetist's tray of our hospitals up and down the country. I am not implying that any professional anæsthetist would think of applying such an instrument to the tongue of his patient, but in the heat of the moment, when it suddenly becomes necessary to draw the tongue forward, as long as this contraption is at hand it will continue to be used by those whose duty it is to administer anæsthetics. For weeks after



its application the tongue is swollen and painful. The bruising and subsequent inflammation constitutes a clinical entity—linguotritic glossitis. I have observed several examples of this condition, which may be said to be the only omission from that masterpiece of surgical monographs, Butlin's "Diseases of the Tongue." The remedy is simple. The linguotrite should be once and for all relegated to the dust-bin, and a pair of rational tongue forceps substituted. I am, Sir, yours faithfully,
Sept. 10th, 1926. HAMILTON BAILEY.

THE PATHOLOGICAL SERVICE OF THE GENERAL HOSPITAL.

To the Editor of THE LANCET.

SIR,—I entirely agree with Dr. Powell White. The pathologist has quite enough to put up with in competition with commercial, greater hospital, and university laboratories without having his own hospital interfering with his private work. As to paying a stipend and receiving rent (which would be practically impossible to assess) the hospital would be giving with one hand and receiving with the other, the pathologist remaining a paid servant, giving hospital cases precedence and possibly losing private work.

I think the only satisfactory solution has been found here. The hospital provides the laboratory and its equipment ; the pathologist is a member of the honorary medical staff, and he practises as a specialist consultant in the strictest sense. He also

does a good deal of public health work, being paid according to an agreed scale of fees for each item. He is his own master, he does not give preference to any case, hospital or private, he takes them as they come, on their necessity. He certainly has to work very hard, and consulting specialist practice in the country is not brilliantly remunerative, but he retains his self-respect and makes enough to live on with the ordinary decencies of life, although he cannot afford a car, which is not a professional necessity in his case.

I am, Sir, yours faithfully,
H. ST. ARNAUD AGATE.

Pathological Department, General Infirmary,
Salisbury, Sept. 9th, 1926.

JUSTICE FOR HOMER BOSTWICK.

To the Editor of THE LANCET.

SIR,—There has recently come into my hands an example of literary piracy of an extremely interesting type which, for historical and other reasons, I should like to comment upon. The pirate was a Dr. Homer Bostwick, who practised in New York between 1840 and 1870. The victims were Philippe Ricord, the famous French syphilologist, and his London pupil, William Acton.

Briefly the facts are as follows: In 1848 there appeared a volume, "A Complete Practical Work on the Nature and Treatment of Venereal Diseases, and other Affections of the Genito-Urinary Organs of the Male and Female," by Homer Bostwick, M.D. New York: Burgess Stringer and Co., 1848. Bostwick sent a copy to THE LANCET for review, inscribed "Thomas Wakley. J. Henry Bennett. With the respects of the author." It is this copy which is now in my possession. The inscription, I think, is in the author's handwriting, because Bennet's name is wrongly spelt. Why a single copy should have been sent between two men is not very obvious. Possibly it was economy. Henry Bennet was obstetric physician to the Royal Free Hospital at the time, wrote for many years on THE LANCET staff, and was a friend of the Wakley family. The copy contains a series of caustic pencilled notes, in the margins, on which the review, to be presently commented upon, was afterwards built. Apparently this is the only copy of the work in London; and, I think, it must have been sent to Acton as a curiosity of piracy after Wakley had finished with it. Acton's library passed to Sir Alfred Cooper, formerly senior surgeon to the London Lock Hospital, and from Cooper's library it, with other books of Acton, came to me. Probably after the castigation which it received in THE LANCET the book fell dead on the market. And yet, in spite of everything said, and truly said, against it, re-reading it now, nearly 80 years after, with an unbiased mind, I have been much impressed by certain opinions expressed and statements made, which, unorthodox in their day, have since been proved correct. Bostwick may have been a pirate, but he was also an acute clinician; and it is in the hope that some reader may be able to supply details about this forgotten author that I wish to resurrect the matter.

The review appeared in THE LANCET of 1849, vol. i., p. 401. It begins:—

> "We doubt, brother Jonathan, if it was a smart trick in you to send us this book for review. So long as it occupied the shelves of your publisher, in Broadway, or was read in the repudiating States, the deception might have been undiscovered . . . but with us your fine plumage cannot conceal your daw's carcass, for your book contains nothing good but what you have pillaged from this side of the Atlantic. . . ."

Imagine starting a review thus in these days! But at that time there was considerable irritation in England against the United States, because certain individual States had borrowed money for railway and other public services, and when the interest became due had repudiated responsibility, leaving the bond-holders high and dry. But why visit the sins of defaulting States on an unfortunate medical writer? Again I quote from the review:—

> "In looking over the American annals of literature, we must all be painfully struck with the injustice of United States men in seizing our best surgical works, and reprinting them, as soon as published, with what are called Notes by Dr. This, or Observations by Mr. That. . . . Doubtless it is easier to steal a book than write one, even though it contain trash; but we very much question if this dishonest system is likely to protect or foster native talent, any more than it will improve national morals, or promote international respect and brotherly feeling."

Here the reviewer is giving vent to his indignation as a writer upon seeing literary property stolen before his eyes; and even now the United States remain the only great nation refusing to recognise international copyright, even though large sums of American money reach English authors.

Having thus pilloried the States, and the publishers' morals, the reviewer returns to Bostwick thus:—

> "It was, however, left for Dr. Bostwick to outvie any of his countrymen in injustice to authors on this side of the Atlantic. In a large, handsome quarto, with coloured plates, woodcuts, and bold type, he has, under his own name, published a book on Venereal Diseases, which, almost from beginning to end, has been plundered from the works of M. Ricord and Mr. Acton."

The great feature of the work, the profusion of coloured plates, is thus dealt with:—

> "'Some of the drawings,'" Bostwick says, "'I have borrowed from the great work of Ricord, others from Acton and some I have taken directly from life.'"

On this it is commented:—

> "Whatever his 'returns' may be, his 'borrowings' have been pretty considerable. We have looked into the works in question, and believe we can trace every coloured plate or woodcut (about 70 in number), except one, to English or French treatises. . . . But our transatlantic daw, not content with this wholesale borrowing, as he calls it, has so maimed the descriptive history of the plates that it would be difficult for even the author . . . . to recognise the production of his own pen."

The slating is justified. I have gone over the plates of Ricord and Acton to verify this statement, and can confirm it. The real deception is in the text opposite the plates. These are quite accurately translated from the French, but wherever such a remark as "M. Ricord prescribed," or names of places such as "Paris" or "Belgium" occur, these are left out, in order, as the reviewer remarks,

> "that the reader might suppose that the drawing is made by the author, and the case happened in his practice; the swindle is made more complete by neither artist's nor author's name being mentioned."

The fraud is quite obvious, and yet, reading the book now, without prejudice, one is struck by its extraordinary lucidity, its broad sanity, its modern note, and its refusal to be intimidated by the authority of a great name. Anyone conversant with the history of syphilis will remember that John Hunter considered secondary syphilis was non-contagious, that Ricord maintained the same, and that owing to the authority of these great names the truth did not become generally recognised until about 1870. It is true Babington at the Lock Hospital disputed it, and that Dr. Wallace, of Dublin, published in THE LANCET (April 23rd, 1836, p. 132) an account of how he inoculated five healthy persons with secondary syphilis and produced primary sores therefrom. But no one seems to have believed him at the time. Whether Bostwick was acquainted with Wallace's work is doubtful, but at any rate we find him vigorously maintaining in 1848, on pages 131 and 132 of his book, the present modern view.

All through my copy of the book are pencilled notes, as I have mentioned before, and certainly the author is ill treated, in view (it must be remembered

of what we now know. Against a passage describing how some patients acquired syphilis by rubbing the legs of sufferers from periosteal nodes the note is—"Out-Herod's Herod." Against a statement that syphilis of the lung may occur and simulate consumption is the comment "opposed to facts." Bostwick's explanation of Colles's Law (p. 181) that the reason a syphilitic child cannot infect its mother is because she already has the disease herself is the earliest correct one known to me. There is a curious story (p. 211) of how the author produced gonorrhœa in two male patients by passing a bougie on them six weeks after he had used it on a case of acute gonorrhœa. The bougie had been washed carefully and put aside, he says, but on examining it he found a small crack in which he surmised the "virus" had remained. The remark of the reviewer on the margin is "bosh."

No one can complain of a reviewer whose opinions are the standard opinions of his time, but when the work dealt with is in front of that time the situation is a hard one. At any rate, true views ought to be credited to their author when they have been confirmed later; and Bostwick seems to have been something of a pioneer.

What position he held amongst his contemporaries it is difficult to discover. He is responsible for three books: (1) One on "Seminal Diseases," the second edition of which was reviewed slightingly in THE LANCET, 1849, vol. i., p. 97. (2) The work on syphilis, &c., on which we have been commenting, 1848. (3) A curious brochure entitled, "An enquiry in the cause of natural death, or death from old age. Developing a new and certain method of preventing the consolidation or ossification of the body, and of thus indefinitely prolonging vigorous, elastic, and buoyant health, and of rendering parturition easy and safe." 8vo, pp. 152. N.Y.: Stringer and Townsend, 1851. Nothing then appears to have come from his pen until 1871, when he started a journal, "Bostwick's Medical and Surgical Journal," Nos. 1 and 2, January, February, 1871. Only two issues were published. Probably he died somewhere about this time. Perhaps some American reader can supply further details.

I am, Sir, yours faithfully,

J. JOHNSTON ABRAHAM.

Harley-street, W., Sept. 13th, 1926.

REGISTERED NURSES' BUREAU

To the Editor of THE LANCET.

SIR,—May I be allowed to draw the attention of my professional colleagues to the fact that the R.N.B. (which is not being run for profit) is in a position to send to them any kind of nurse desired from its staff which is now thoroughly organised, and to express the hope that they will endorse and support this effort to *protect* the nurse (in eliminating for her the heavy weekly commission she has hitherto had to pay upon her fees) by applying to it when requiring nurses.

I am glad to be able to assure my colleagues that the R.N.B. is thoroughly organised on excellent business as well as strictly professional lines, and embraces every nursing activity and requirement in surgery and medicine. It has the endorsement of leading members of both professions, including members of the General Nursing Council and of the Council of the College of Nursing. Its professional side is entirely in the hands of specially chosen trained State-registered nurses, to whom alone a practitioner telephoning gives his instructions. The address is 55, Chancery-lane, and the telephone is Holborn 6846.

I am, Sir, yours faithfully,

W. ARBUTHNOT LANE,
Chairman, Honorary Advisory Committee.

Cavendish-square, W., Sept. 13th, 1926.

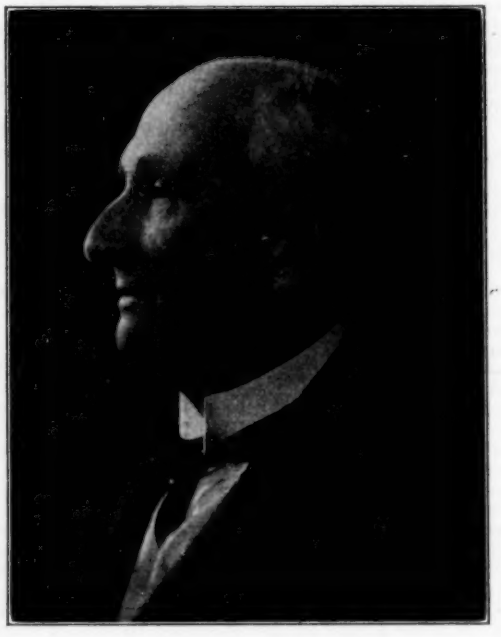
Obituary.

HERBERT WILLIAM PAGE, M.CH. CAMB., F.R.C.S. ENG.,

CONSULTING SURGEON, ST. MARY'S HOSPITAL, LONDON

WE regret to announce the death of Mr. Herbert William Page, consulting surgeon to St. Mary's Hospital, which occurred at Sedgecombe House, Farnham, his home in the country, on Sept. 9th, in his 81st year. He had for a considerable period retired from active practice as a consulting surgeon, when he was famous as an expert in the difficult pathological field of railway injury.

Herbert William Page was born in 1845, the son of a well-known practitioner in Carlisle, William Bousfield Page, and was educated in Edinburgh and later at Christ's College, Cambridge. At Cambridge he graduated in Arts, his medical education being



MR. H. W. PAGE.

at the London Hospital. The staff at "the London" at that time included three particularly great men—Hughlings Jackson and Gawen Sutton were the lecturers on pathology and morbid anatomy, while Jonathan Hutchinson was a senior on the surgical side. The influence which these learned men and inspiring teachers had upon Page is illustrated by the fact that although he decided early to follow the career of a consulting surgeon, in all his institutional and public and private work he displayed general familiarity with the problems of medicine. In 1870 he graduated M.B. at Cambridge, and almost immediately obtained a commission in the German Army on the outbreak of the Franco-Prussian War. He served as a surgeon through the war, and on his return to England he joined his father for a short time in practice at Carlisle, but it was not long before he made up his mind to return to London and the practice of surgery. He took the F.R.C.S. Eng. and made his start as surgical registrar to his old hospital. He was elected assistant surgeon at St. Mary's Hospital in 1876 and served on the staff of the hospital as surgeon and teacher for the full term of 30 years when he was elected consulting surgeon.

Page's surgery was marked by an earnest conscientiousness and by an almost meticulous attention to detail. He was the first surgeon at St. Mary's to rely on instruments and dressings sterilised by heat rather than by antiseptics, and while he was essentially conservative, he was not reactionary; indeed, in 1887 he performed for the first time at his hospital the operation of gastro-enterostomy. The patient was a man of 48 who had suffered from malignant obstruction of the pylorus for several months; the operation gave him much relief and he lived in comparative comfort for 72 days. In a paper read to the Royal Medical and Chirurgical Society 18 months later Page reviewed the results of 38 cases in which the operation had been done, and pleaded for its more common use in this country. It was, he said, an operation distinctly justifiable and to be recommended, for it was capable of bringing relief to the distressing symptoms incidental to pyloric obstruction, and was thereby in all probability the means of prolonging life. Forty years ago such arguments were really advanced.

"To the average student," writes one of Page's intimate colleagues, "Page was not an attractive teacher. His formal lectures were scholarly and profound and were expressed in the most polished English, but they lacked those dramatic qualities which endow dull facts with life. He was seen at his best in an informal clinical lecture, usually prepared for the purpose of demonstrating certain cases in the wards. Models of clear thinking and of lucid exposition, many of these lectures remained in the memories of those who heard them, to be applied years afterwards to the elucidation of similar problems. In 1897 he collected 12 of these lectures and published them under the title of 'Clinical Papers on Surgical Subjects,' a little book which can still be read with advantage by even the youngest. He possessed to a degree, vouchsafed to few, the power of speech. A wonderful choice of words, a clear diction, and a melodious voice gave to his speeches a distinction which was still further enhanced by his clarity of thought and by a touch of whimsical humour. A speech from Page decorated any occasion, however prosaic, and translated it at once from the common-place. The possession of these qualities, combined with his intimate knowledge of the subject, rendered him an invaluable witness at a time when the railway companies considered it necessary to contest excessive claims against them for damages as the result of accidents. The legal opinion of Page as an expert witness cannot better be illustrated than by quoting the shorthand writer's notes of Lord Chief Justice Coleridge's summing up in the case of Milsom *v.* the L. & N.W.Rly. Co., 1879.

"This I will say, that whereas it is most difficult very often to follow the reasons and to apply the ordinary rules of common sense to the evidence given by Dr. R. and Mr. G. I do not think any man of the most ordinary common sense would have the least difficulty in following the evidence of Mr. Page and in ascertaining exactly and definitely what Mr. Page meant to say. Whether you believe Mr. Page is another matter, but he is such a comprehensible and intelligible witness as I very seldom have heard in the witness-box. A child might understand him, and he gave his evidence with lucidity and firmness. Of course it is in your hands, of course it is for you to say whether you believe him or not, but as far as one could judge, a more cool and intelligent man, a person who seemed to estimate the value of the words he is using, it has seldom been my good fortune to see before a judge and jury."

"Page's character was distinguished by the simplicity of true greatness. He was singularly direct, incapable of any finesse, and often embarrassingly frank. His reserve almost amounted to shyness, and he shrank from anything approaching publicity or advertisement. He had a great capacity for friendship and his loyalty to his old friends, many of whom dated from his student days, was a source to him of some distress as he outlived so many. To those who remain and who have enjoyed the charming intimacy of his friendship his loss is irreparable."

To return to Page's interest in railway injuries—shortly after his connexion with St. Mary's Hospital he was appointed surgeon to two great railways—the London and North-Western and the Great Western—and this occurred at a time when the after-results of railway accidents were exercising very much the public mind, and when medical opinions on the subject were widely sought in the law courts. It is true that the time had gone by when universal medical support could be found for the beliefs prevalent 20 years before, that the physical conditions of the public were suffering ominously as the result of the development of railway travelling. As far back as 1862 there had appeared in THE LANCET the results of a detailed inquiry into the influence of railway travelling on public health, in which the Great Northern Railway and the Great Western Railway, among others, were two of the lines inspected from this standpoint; the conclusions of this inquiry did much to remove apprehensions with regard to huge and mysterious physiological damage dependent upon alterations of atmospheric pressure, upon the great pace of transit and so on, but the sequelæ of actual accidents occurring to certain patients remained unexplained. Some four years later Erichsen wrote a work on Concussion of the Spine, the condition identified by him as of occurrence in railway accidents in particular, and his views were accepted by the medical profession, though with some reserve, certain cases for compensation suggesting that Erichsen's views had conferred the appearance of physical reality upon imaginary things. The medical profession was divided in view, despite the apparent acquiescence in the attitude of a great leader, and Page came to play a leading part in the matter. In 1881 the subject for the Boylston prize of the University of Harvard was "Injuries of the back without apparent mechanical lesions, in their surgical and medico-legal aspects." This prize Page won for an essay founded upon his personal experience as surgeon to two great railways, and the essay, enlarged and somewhat altered in title, became the first edition of his well-known work on the subject of railway injuries. The book was an immediate success. In it there were tabulated a series of cases of railway injury which, on the one hand, presented much the clinical picture which had already been drawn by Erichsen, and in which, on the other hand, no evidence satisfactory to Page could be found of any injury whatever to the spinal cord or its membranes. He was able to account for many of the symptoms, which had been regarded as of a particularly malign character, inasmuch as they illustrated degeneration of the spinal cord, as the expression of traumatism to bones or muscles, and having no such sinister expectations; he consequently came into conflict with Erichsen's followers who had evolved for the condition, named Concussion of the Spine, a complete pathology. Page's conflict with Erichsen's views was openly expressed, and as those views were the ones generally adopted by medical witnesses in cases for damage, the expression of his convictions required courage. Page spoke openly; he was even reproved for his uncompromising attitude towards his seniors, and he prevailed, how completely will be seen by anyone who consults the surgical manuals of the eighties and compares them with those a few years later. From this time forward Page was recognised as an authority on railway injuries, and the part played by traumatic neurasthenia in the symptoms following accidents by rail was generally accepted. His position regarding "railway spine" was: That it was a mental condition caused partly by the pain due to a definite injury to ligamentous and muscular structures of the spinal column, and partly by the apprehension of the unknown consequences which might flow from this. He held that the condition was maintained and augmented by auto-suggestion and by the fear that all this suffering would not be sufficiently compensated. He was careful not to use the word malingering. His conception displaced the view that the symptoms of which the sufferers complained were due to a "Concussion of the spinal

cord" analogous to the condition known as "Concussion of the brain." This work gained Page the unusual distinction for a surgeon of the Presidency of the Neurological Society.

At the Royal College of Surgeons of England he was elected a member of the Council in 1899 and served on that body for eight years, and for the same period he was a member of the Court of Examiners. He was also an examiner in surgery at the Universities of Cambridge, Oxford, and Birmingham, and in the discharge of these duties he displayed the qualities of accuracy and sound judgment that marked his surgical work. He retired from practice 20 years ago, which is a long period when a professional career is under consideration, but he will be remembered for those qualities by those who came into contact with him as colleague or teacher.

He married first a daughter of the Rev. Christopher Parker, by whom he had two daughters, and secondly Kathleen, daughter of the Rev. Canon Houghton, who survives him.

THE LATE DR. E. I. BOSTOCK.—Dr. Edward Ingram Bostock, who died at Horsham on Sept. 4th in his eighty-third year, was a son of the late Dr. J. S. Bostock. He studied medicine at St. Bartholomew's Hospital, and soon after qualifying, in 1864, joined his father in practice at Horsham. As a practitioner Dr. Bostock was keen and sympathetic, and his diagnostic ability won the implicit confidence of his patients. When visiting he used to drive round in a high carriage with large yellow-painted wheels, and his practice covered a large area in North Sussex. Nevertheless, he found time to take an active interest in parochial matters for over 40 years. He was one of the original members of the West Sussex County Council, and a Justice of the Peace: in his early days he was identified with the Volunteer movement. All his six sons served in the Army during the war, and three were killed in action. Dr. Bostock's health gradually declined after the death of his wife in 1921, but he remained a well-known figure in Horsham, and there was a large gathering at his funeral to show the respect in which he was held.

THE LATE DR. J. H. TONKING.—After attending to his practice as usual on the day before, Dr. John Herbert Tonking was found on Sept. 4th to have died in his sleep. He was 62 years of age, and was the son of the late Mr. C. H. Tonking, for many years chemist at Camborne. Educated at Ford's School, Camborne, he served as apprentice to a local doctor before going to London for his medical studies. After taking the conjoint qualification in 1886 he became house surgeon at St. Thomas's Hospital, and two years later graduated as M.B. in the University of London. Thirty-nine years ago he went back to his native town, where his services came to be greatly valued. He was consulting surgeon to St. Michael's Hospital, Hayle, and to Helston Cottage Hospital, and held a number of other local appointments. Besides articles in medical journals he submitted a Note on the Tubercular Nature of the Final Stage of Miners' Phthisis to the Royal Commission set up to inquire into the mortality of Cornish miners. Dr. Tonking had three children. His elder son was killed in France during the war, and his daughter died recently. He leaves a widow.

EGYPTIAN SCHOOL OF MEDICINE.—The Egyptian Government has decided not to go on with its plan to build a new school of medicine with a hospital at Abbassia, and announces its intention to revert to the original scheme for building on the Manial Roda Island site, as recommended by an expert commission in 1919.

THE FUTURE OF VOLUNTARY HOSPITALS.—In a speech at the mayoral lunch, when Princess Mary laid the foundation-stone of the new infirmary buildings at Harrogate, Sir Berkeley Moynihan expressed the opinion that in all hospitals there must be established paying beds and paying wards. He believed that in the future, even the richest people "would look upon it as their duty, certainly their need, to have hospital treatment." In America and Canada hospital treatment was "far better than anything even the richest of private patients could get in ordinary circumstances to-day." He added that the old tradition of hospital construction would have to be broken, and that there is now "a great opportunity for somebody to devise a new kind of hospital which will be cheap, easily capable of extension upon the original plan, and from the professional point of view of even greater efficiency than the old hospitals."

Medical News.

MEDICAL WOMEN'S INTERNATIONAL ASSOCIATION.—This association held a council meeting in Prague on August 26th and 29th. Lady Barrett, the President, took the chair, and reports of the activities of the various national associations were presented by the respective national corresponding secretaries. The most recently formed association is that of Hungary, and Hungarian delegates attended the meeting for the first time. In addition to the other business of the council, medical meetings were held, at which papers were communicated on (1) Tuberculosis and Pregnancy and (2) Women as Police Surgeons. Representatives from the Czecho-Slovak Ministry of Health attended these, and took a prominent part in the discussions, a full report of which will be published in the next number of the *Medical Women's International Journal*. The President gave a dinner to the delegates on the night preceding the council, at which she welcomed the Lord Mayor of Prague and other officials. The association was also fortunate in having been invited to hold all its meetings in the old Town Hall. The Lord Mayor and town councillors received the delegates and entertained them at luncheon and the State railways and Ministry of Health arranged a full programme, granting facilities to the delegates to visit various spas, hospitals, and institutions.

WEEKLY CONTRIBUTIONS AT OXFORD.—The governors of the Radcliffe Infirmary at Oxford report that the weekly contribution scheme has been a brilliant success. During the last financial year it brought in £25,400, or 60 per cent. of the total income.

POST-GRADUATE COURSES IN VIENNA.—In our issue of Sept. 4th (p. 519) a note was published on courses given by the Medical Faculty at Vienna. The address at which application may be made to the Secretary of the Post-graduate Medical Courses should have been given as Schlösselgasse 22, Vienna VIII., and not Schlösselgasse 32.

KING'S COLLEGE HOSPITAL MEDICAL SCHOOL.—The winter session will be formally opened on Friday, Oct. 1st, at 2.30 P.M., when the introductory address will be given by Sir Humphry Rolleston, Regius Professor of Physic in the University of Cambridge. The annual dinner of past and present students will be held on the same day at 7 for 7.30 P.M. at the Criterion Restaurant, Piccadilly. Dr. Frank H. Jacob will take the chair.

LONDON HOSPITAL: CHILDREN'S DEPARTMENT.—The quarterly report of the house committee states that the reorganised children's out-patient department, which is being financed by the East-End Tradesmen's Association, started work on July 15th. It is intended that the department shall act as a consultative centre and for the treatment of more difficult cases. The demands upon it have increased so rapidly that the days of opening have already had to be increased from two to three a week.

NORTHERN INFIRMARY, INVERNESS.—Towards the £100,000 required for the reconstruction and enlargement £40,000 has been received or promised and the directors intend to begin the work so soon as £50,000 is available. They state that the enormous increase in the number of motorists, with the consequent danger of accidents, has made enlargement imperative "at the earliest possible moment." A number of owners and tenants of grouse moors have sent the proceeds of their sales of game to the infirmary.

DISCOVERY OF HOSPITAL RECORDS.—Upon clearing out the roof of the Royal Hampshire County Hospital at Winchester two portraits in oil, a commemorative armorial tablet, and the first minute-book of the court of governors were discovered. One of the portraits represents the Rev. Dr. Alured Clarke, the founder of the hospital, dated 1736. The other was that of Alderman Edward Taunton, of Southampton, whose connexion with the institution is being investigated. The minute-book is also dated 1736. The armorial tablet records that, in 1760, Colonel Narbonne Berkeley fitted up the board room at his own expense.

DONATIONS AND BEQUESTS.—The late Sir John Williams, Bart., who left estate of the gross value of £123,742, with net personality £121,012, bequeathed £2000 to University College Hospital, London, and £1550 and any of his books, pictures, MSS., &c., they may select to the National Library of Wales. The residue of the property, which, after other bequests to servants, will amount to nearly £100,000, is to be divided between the National

Library of Wales and the University College of Wales, Aberystwyth.—The late Sir Frederick W. Mott left estate of the gross value of £22,241, with net personality £16,862. After a small personal bequest he left the residue of the property, subject to certain trusts, failing which, with remainder to the University of London for the endowment or partial endowment of a Professorship of Psychological Medicine "at my Alma Mater," the Medical School of University College Hospital, stating that he did not wish the professorship to be founded until there should be sufficient accommodation for the study and treatment of early cases of mental disorder either in wards in University College Hospital or in an affiliated mental hospital.—Mr. R. B. Sharp and Mr. F. B. Sharp, of the firm of John Sharp and Sons, jute spinners, Dundee, have made a gift of £30,000 to the Dundee Royal Infirmary for the purpose of building and equipping a new maternity hospital.—Mr. Charles W. Bell-Raisbeck, M.A., assistant master of Cheltenham College, besides many other institutional and other bequests, left £1000 to the Cheltenham General Hospital.—From the residue of the property of Mr. Harry Watson, of Bath, the Cottage Hospital, Whitby, Yorks, will receive about £850; the Royal United Hospital, Bath, the British Hospital, Buenos Aires, St. Dunstan's Home for the Blind, the Royal Hospital for Incurables, Putney, and Dr. Barnardo's Homes, each, will receive about £560.—Miss Alice Wild, of Oldham, left £1000 to Oldham Royal Infirmary and £500 to Henshaw's Blue Coat School.—Mr. Frederick Thomas Alton, of Stamford, Lincolnshire, a pawnbroker, left estate of the gross value of £57,852. The testator, after bequests amounting to about £16,000, left the residue of his property to accumulate during the longest period allowed by law, but not later than the year 2000, and then the capital and accumulated interest to be divided equally between the Manchester Infirmary, the Gloucester Infirmary, Guy's Hospital, and St. Thomas's Hospital, London, and the British and Foreign Bible Society.

INFECTIOUS DISEASE IN ENGLAND AND WALES DURING THE WEEK ENDED SEPT. 4TH, 1926.

Notifications.—The following cases of infectious disease were notified during the week :—Small-pox, 79 (last week 90); scarlet fever, 1260; diphtheria, 716; enteric fever, 71; pneumonia, 395; plague, 2; puerperal fever, 44; cerebro-spinal fever, 4; acute poliomyelitis, 41; acute polio-encephalitis, 2; encephalitis lethargica, 29; dysentery, 8; ophthalmia neonatorum, 107. There were no cases of cholera or typhus fever notified during the week. The 2 cases of plague, as mentioned in our news columns last week, were notified from Liverpool.

Deaths.—In the aggregate of great towns, including London, there were no deaths from small-pox, 3 (2) from enteric fever, 6 (0) from measles, 6 (4) from scarlet fever, 27 (4) from whooping-cough, 30 (5) from diphtheria, 161 (33) from diarrhœa and enteritis under two years, and 19 (3) from influenza. The returns from diarrhœa and enteritis again show a moderate rise, but have by no means reached the figures of the corresponding week a year ago. The figures in parentheses are those for London itself.

Medical Diary.

Information to be included in this column should reach us in proper form on Tuesday, and cannot appear if it reaches us later than the first post on Wednesday morning.

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

CENTRAL LONDON THROAT, NOSE AND EAR HOSPITAL, Gray's Inn-road, W.C.

A Preliminary Course of Six Lectures on the Methods of Examination and Diagnosis commenced on Sept. 15th.

An Intensive Course of Lectures and Operative Surgery commences on Oct. 4th.

Full syllabus on application to the Dean.

POST-GRADUATE HOSTEL, Imperial Hotel, Russell-square, W.C.

TUESDAY, Sept. 21st.—9 P.M., Prof. J. E. S. Frazer will open a Discussion on Some Clinical Bearings of Embryology.

WEDNESDAY.—9 P.M., Sir Squire Sprigge will open a Discussion on Medical Communications to the Lay Press.

FRIDAY.—9 P.M., Dr. Langdon Brown will open a Discussion on The General Effect of the Sympathetic in Disease.

All medical practitioners are cordially invited.

Appointments.

HARDIE, D., M.B., Ch.B. Glasg., has been appointed Assistant Ophthalmic Surgeon to the Royal Infirmary, Aberdeen.

Queen Charlotte's Maternity Hospital: REID, J. K., M.B., Ch.B. Edin., Senior Resident Medical Officer; CLEMMEY, A. V., M.B., Ch.B., Assistant Resident Medical Officer; PROSSER, L. J., M.B., Ch.B. Manch., District Resident Medical Officer.

Vacancies.

For further information refer to the advertisement columns.

Bristol General Hospital.—Sen. Res. M.O. £200.

Bristol Royal Infirmary.—Asst. P. in charge of Ante-natal Dept.

Cancer Hospital, Fulham-road, S.W.—Clin. Asst. £250.

Cardiff, Prince of Wales Hospital.—H.S. £100.

Central London Ophthalmic Hospital, Judd-street, St. Pancras, W.C.—Sen. and Jun. H.S.'s. At rate of £100 and £50 respectively.

Dewsbury and District General Infirmary.—H.S. £200.

Dominica, British West Indies.—M.O.H. £1000.

Evelina Hospital for Children, Southwark, S.E.—H.P. £120.

Grosvenor Hospital for Women, Vincent-square, S.W.—Hon. Reg.

Hôpital Français, 172, Shaftesbury-avenue, W.C.—Sen. and Jun. Res. M.O.'s. £120 and £100 respectively. Also Surg. to In-patients and Surg. to Out-patients.

Hospital for Consumption and Diseases of the Chest, Brompton, S.W.—Asst. Res. M.O. At rate of £150.

Hospital for Epilepsy and Paralysis, Maida Vale, W.—Res. M.O. and H.P. At rate of £150 and £100 respectively.

Hospital for Sick Children, Great Ormond-street, W.C.—H.S., H.P., and Asst. Cas. O. Each at rate of £50.

Hull Royal Infirmary.—Cas. H.S. At rate of £130.

King's College Hospital, Denmark-hill, S.E.—Clin. Assts., Med. and Surg. D.'s, &c.

Lancashire Asylums Board.—Pathologist. £1000.

Lincoln County Hospital.—Jun. H.S. At rate of £150.

Miller General Hospital for South-East London, Greenwich-road, S.E.—H.P. £125.

Prince of Wales's General Hospital, Tottenham, N.—Two H.S.'s and H.P. Each at rate of £120. Also Jun. H.S. and Jun. H.P. At rate of £90 each.

Royal London Ophthalmic Hospital, City-road, E.C.—Asst. S.

Royal Northern Hospital, Holloway, N.—Obstet. H.S. Also H.S. Each at rate of £70.

St. Mary's Hospital for Women and Children, Plaistow, E.—Hon. Asst. P. Also Clin. Asst

Salford City.—Bacteriologist. £600.

Salford Royal Hospital.—Radiologist. £300.

Samaritan Free Hospital for Women, Marylebone-road, N.W.—H.S. At rate of £100.

Sheffield Royal Hospital.—Vacancies on Res. Med. and Surg. Staff. At rate of £80.

South London Hospital for Women, South Side, Clapham Common, S.W.—H.P. and three H.S.'s. Each at rate of £50. Also Clin. Asst. £1 1s. per attendance.

Stoke-on-Trent, North Staffordshire Royal Infirmary.—H.S. £150.

Swansea County Borough.—Asst. M.O. £600.

The Chief Inspector of Factories announces a vacancy for a Certifying Factory Surgeon at Castleton, Derbyshire.

Births, Marriages, and Deaths.

BIRTHS.

CLARK.—On Sept. 7th, at Walker-street, Edinburgh, the wife of Alfred J. Clark, M.D., of a son.

FOULKES.—On Sept. 3rd, to Mary G. Foulkes, M.R.C.S., L.R.C.P., the wife of R. K. Foulkes, M.B., B.S., of 6, Barnfield-crescent, Exeter—a daughter.

HOOPER.—On Sept. 6th, at the City Mental Hospital, Fulford, York, the wife of Reginald Hooper, M.B., of a daughter.

KILNER.—On Sept. 8th, at Abbotsford, Mostyn-avenue, Llandudno, the wife of S. D. Kilner, M.D., of a daughter.

ROSS.—On Sept. 8th, at the Avenue Nursing Home, Cheam, the wife of J. N. MacBean Ross, *M.C.*, M.D., F.R.C.S., of Worcester House, Sutton, Surrey, of a son.

MARRIAGES.

FAIRBAIRN—MORE GORDON.—On Sept. 11th, at Old St. Paul's Church, Edinburgh, William Ronald Dodds Fairbairn, M.A., M.B., Ch.B., Dipl. Psych. Edin., to Mary Ann, only daughter of the late Mr. Harry More Gordon, of Charleton and Kinnaber, Forfarshire, and Mrs. More Gordon, Albert-terrace, Edinburgh.

MESSER—DELVES.—On Sept. 9th, at the Parish Church, Long Preston, Yorkshire, William Messer, M.B., to Catherine Monica Mary, daughter of the late Thomas Hirst Delves, and of Mrs. Delves, Lochinvar, Long Preston.

DEATHS.

BURKITT.—On Sept. 7th, at a nursing home in London, after an operation, William Arthur Handcock Burkitt, M.D., of Goulburn, New South Wales, Australia, aged 63.

N.B.—A fee of 7s. 6d. is charged for the insertion of Notices of Births, Marriages, and Deaths.

Notes, Comments, and Abstracts.

WHAT IS A MENTAL ILLNESS?*

BY NOEL H. M. BURKE, M.R.C.S. ENG., D.P.M. LOND.

QUITE recently a curious diagnosis was found among the records of a patient. This person was said to be suffering from "brain disease" and, in brackets, "functional." The label was the more amazing because there was no justification for any diagnosis of brain disease from the physical signs or symptoms, though there was reason to think there was a so-called functional disorder. It is safe to assume that this evidence of confused thought was the work of one not well versed in the subject of medical psychology. Yet in the last few months it has become apparent that those who are can be as careless in their approach to their own subject.

At a recent meeting to discuss the early treatment of mental disease, someone spoke of his experience with malaria as a therapeutic agent for general paralysis of the insane. In another meeting, at Bath last summer, the subject was supposed to be the prevention of mental disease, and much time was taken up with the consideration of nasal, oral, and other sepsis, while a question was asked about a pure water-supply in some district.

It is hard to understand the importance of sepsis in the causation of any mental disease, at any rate in the sense implied by its advocates. Nor is it easy to believe that an attack of malaria has any curative value in any mental disease, though we may be impressed by what is reported of its use in the treatment of general paralysis. In other words, it is an error in the use of labels to class G.P.I. as a mental disease, and there is loose thinking somewhere in the argument that gives to toxic absorption an important place in the ætiology of any truly mental illness.

The Psychological Point of View.

At first approach to this subject it seems quite easy to define a mental illness and to differentiate this group from that of the bodily illnesses, but the more one looks into the matter the less simple does it appear, and the more important are the difficulties to easy classification. In the first place it is clear that the term mental illness must mean an illness of mind. That, at least, seems to be the logical meaning of the words used. We are at once called upon for a definition of mind, and at once we find disagreement amongst the experts, and a whole list of theories, each well supported by argument, from which we may choose that which seems most reasonable. What is mind and what is its relation to body?

Between monism, dualism, parallelism, epiphenomenalism, and so on, which is the view that approaches most nearly to the truth? This is not, perhaps, the place for a laboured discussion of these questions, but we should be on safe ground and should meet with a good deal of agreement in selecting an Aristotelian form of definition for mind as being the sum total of the functioning of the whole organism. This appears to be the most satisfactory way of viewing the matter. Mind seems to be, not the manifestations of the activity of a limb, a brain, an eye or a tooth, but of a whole organism. It seems to depend on the existence of such organism or subject, and on the state of that subject in virtue of being alive.

The elements of mentality are summed up in a way that all can accept under the headings of thinking, feeling, and striving. Now if this be a satisfactory description of mind it would seem that a mental illness is an illness, not of a limb, a brain, or a tooth, nor of any material part of a subject, but of that general functional quality of the subject which is his mind. Stoddart calls it mentation, and describes it as a process, to distinguish it from the mind which many regard as a thing. Psychologically, a mental illness is one which is seated in those functionings which are subsumed under "thinking, feeling, and striving" as the main forms of mentality or mentation. It is a disorder of memory, perception, emotion, wishing and doing; it prevents the making of normal adjustments to social and other environmental situations, including the internal environment of the subject himself.

If this be an approximately true description of the essence of a mental illness, it is clear that the disorder is quite different from a brain disease or other purely bodily lesion, and that the mechanism of the two is different. It follows that the causation is also different, and in causation we have the great distinguishing feature. A bodily illness is a disorder of some tissue, organ, or system, caused by intrinsic defect, noxious external influences, or a disturbance of the adequate balance between intrinsic strength and external stimuli. Similarly, a mental illness is a disorder of mind caused by inherent defect, noxious external influences, or a disturbance of the adequate balance between attacking and defending forces. In the case of the former, however, the external noxious influence is of material nature; in the case of mental illness it is of a mental nature. Thought does not add a cubit to the stature. Food, light, and exercise may do so. A blow hurts a boy's body; what he thinks about it may throw his mind into a tangle and determine a mental illness.

From the psychological standpoint, then, we must regard a mental illness as one in which mental causes have produced mental malfunction, and we must, for logical exactness, rule out all other pseudo-mental illnesses, such as paralytic dementia. But things are not quite so simple as the position just stated, because, if we are consistent in our reasoning, we must recognise another issue and must be prepared to broaden our definition. We have denied to bodily disease any place in the ætiology of mental disease, for the reason that they belong to different categories both as regards causation and location. But if mind is the sum total of the functioning of a whole organism, what is the effect on such functioning of disorder of some part of the organism? We must allow, at any rate in theory, that any disturbance of structure must necessarily involve modification of the total function, and therefore that all bodily disease must have some mental disorder as a correlate. To some aspects of this we will return later on. For the moment we must consider how much this admission upsets the satisfactory simplicity of the definition. It is a matter of proportion and degree. If one could express the matter numerically and apply the principles of the differential calculus to this part of psychology, one would be able to show the extraordinary insignificance of a clean pin-prick as an influence in altering mentation. The septicæmia that might follow a dirty pin-prick would possess a far higher value, the presence of a tumour in the frontal lobe might rank higher still.

From the psychological standpoint, therefore, the definition must be modified by the use of some such word as "mainly" or "essentially" or "primarily" on the principle of Touchstone when he said "much virtue in 'if.'" A mental disease is then a disorder occurring essentially in the mind of an individual and caused mainly by trauma of a mental nature. This can be put in three words. The essential quality of a mental illness is that it is a psychogenic psychic disorder.

The Philosophical Point of View.

Up to the present we have dismissed rather summarily the problem of the relation of mind to matter. Although in the main a question for the arguments of philosophy, yet we should give some consideration to the philosophic point of view, both for its own sake and for the light it may throw on our more medical problems. In this respect it is interesting to consider the views of Bertrand Russell. In a recently published lecture on "Perception" he refers to the glib way in which people speak of mind and matter as contrasted and opposite entities. There is, as a matter of fact, no such complete opposition and no clear dividing line between the two, but rather a difference of degree. An oyster, for instance, is less mental than a man. The quality of mental-ness has crept in in the transition between the conditions represented by the phrases "There is a triangle" and "I see a triangle." In the latter situation there has been added a subject who has a perception. To Russell, perception is at the meeting point between the physical (sensation) and the mental (the addition of meaning).

He discusses the gradation from physical to mental in another way. There are public and private objects, defined as public when all can see them, and as private when none but the owner or subject can do so. Touch and sight are extremely public processes in this sense, introspection is extremely private. Mental processes, especially dreams, are the most private of all. Again, the distinction is one of degree. What many people can perceive is physical; what only one can perceive, but can locate in a public place, is in his own body and is physiological; what only one can perceive but cannot so localise is purely private and is mental.

In his "Analysis of Mind" Russell deals with this problem much more exhaustively and comes to the same general conclusion, that there is a difference, but that it is not an absolute difference, but rather a gradation through degrees of difference. The main distinguishing feature is the system of causal laws that each obeys, both mental and physical being merely different modes or groupings of one neutral ultimate stuff. Things grouped in such a pattern that they obey physical laws are material, those that obey psychological laws are mental. The whole tendency, nowadays,

* Paper read before the Medical Section, British Psychological Society.

is for physics to become less material while psychology adopts a more material tone.

It is interesting to note that the general trend of this philosophical attitude gives support to the conclusions resulting from a psychological approach. There is a mental illness and there is a physical illness, and they are essentially different, both in cause and location, yet there is no absolute line between the two but a gradual shading from physical through partly mental to purely mental. Consideration of our subject from the medical aspect will lead to the same general conclusion.

The Medical Point of View.

There are two ways in which the physician is interested in mental illness, the clinical and the administrative. In the former he is concerned with disease processes and their effects on the individual, and with therapeutic measures whereby he hopes to help the patient to recover. In the latter he is concerned with the conduct of an institution and with social and legal matters. This is not medicine in the true sense, and it is from the former and truly medical point of view that we must now consider our problem. From this aspect we deal with individual people, men and women, who are ill, and it is our business to understand their present suffering and the cause of that suffering, so that we may discover means of relief.

The study of the ætiology and pathology of mental illness is an essential though difficult part of our work. Failure to attempt it is scientifically slovenly and leaves us as mere empiricists. In the past, and even now to a considerable extent, much of such treatment as is given for mental illness is little more than empirical. Most of it is harmless, some may be helpful, but the rest cure, sea voyage, change of air, potassium bromide, intestinal purification, and similar prescriptions are not informed by any sound knowledge of the real nature and ætiology of mental illness.

It is for these reasons of scientific accuracy, and of ultimate efficiency, that we should form and hold some clear idea of what we mean when we speak of mental illness. Let us review some of the ordinary conditions with which we are called upon to deal, and consider what we can learn from them in answer to our problem.

There is more than one set of views on the classification of mental diseases, but we can avoid entanglement in these smaller problems by keeping our argument on as broad a basis as possible. The mental disorders from which patients suffer do group themselves out into a number of fairly definite and well-recognised units or systems. These are sufficiently well defined to be classed as disease syndromes even if they are not actual disease entities in the full sense. Let us consider them in the light of the suggested definition.

(To be concluded.)

RED CROSS ACTIVITIES IN THE AMERICAS.

AN account of the second Pan-American Red Cross Conference, which met in Washington this summer, appears in the September issue of the *World's Health*. At the congress 16 of the 18 official delegations representing the Red Cross Societies of the American continent came from Central and South America and spoke either Spanish or Portuguese as their native tongue. The number of medical men among the delegates was a convincing proof of the sympathy which unites the medical profession to the Red Cross. Prof. Juan de Dios Villegas-Ruiz, President of the Venezuelan Academy of Medicine, acted as chairman of the session devoted to health activities, and the special committee on health, which was elected to study technical problems, was presided over by Dr. Paz Soldan, professor of hygiene in the University of Lima (Peru). In the course of the various sessions devoted to the discussion of health topics in their relation to Red Cross work, many interesting sidelights were thrown on Latin-American problems. The organisation of public health work in the Central and South American Republics being still in its early stages, the field of activity open to the Red Cross is almost unlimited. In several of the countries the National Red Cross Society is regarded as the leading unofficial health agency, and in all of them there is close coöperation with the official health departments. The Presidents of the Argentine and Brazilian Red Cross Societies are also the directors of the Army Medical Service, while the President of the Chilian Red Cross was formerly the Minister of Health. In Cuba the Director of the Health Service is a prominent Red Cross official, and the leading Peruvian delegate to Washington is professor of hygiene in the University of Lima.

Among the papers read was one by Prof. Villegas-Ruiz, of Venezuela, on the importance of eugenics to public health. He emphasised three points: (*a*) The desirability of a pre-matrimonial medical certificate. (*b*) The importance of child welfare. (*c*) Mental hygiene. The appeal of M. Antonio las Heras Hervas, the blind president of the International Committee of the Blind, drew attention to the incidence of blindness in Latin-America. In the 21 Central and South American Republics there are, he estimates, approximately 115,000 blind persons, and in the whole of this vast territory only ten inadequate institutions exist to care for them, whilst not one periodical or book is published in Braille. The population of the whole of South America approximates that of the United States, but the former has twice as many blind citizens. The speaker appealed to the Red Cross to use its influence on behalf of the blind by making a statistical survey of eye diseases, by conducting intensive propaganda on the subject of hygiene of the eyes, and by fighting the causes of blindness. Prof. Paz Soldan, of Peru, spoke of the rôle of the Red Cross in popular health education, which should be simple and objective.

Housing Problems in Brazil.

Another branch of public health was touched upon by Dr. Amaury de Medeiros, of Brazil, who read a paper on the Red Cross and workmen's dwellings. In South America also there is a housing problem, and the familiar difficulty occurs of the dearth of cheap houses owing to the fact that building small houses for renting is not an attractive commercial proposition. Dr. Amaury de Medeiros described a housing scheme he had carried out at Recife, capital of the province of Pernambuco, in his capacity of Director of Public Health. Most of the existing houses there were nothing more than huts of palm and corrugated iron and were extremely insanitary. He raised 850,000 by public subscription, bought a piece of ground, and erected model workmen's dwellings. These he let at reasonable prices and with the proceeds, after deductions for repairs, he proceeded to build more houses. This scheme has proved most successful. The houses have served as models for many private builders, and the standard of domestic hygiene among the tenants has risen considerably. The speaker appealed to other Red Cross Societies to include housing schemes among their health activities.

Health Education through the Conscript.

Surgeon-General Julio R. Garino, President of the Argentine Red Cross and Director of the Army Medical Service, showed how the work of the Argentine Army Medical Service contributed to the health of the Republic and the prevention of social scourges. The Argentine conscript receives instruction in hygiene from the moment he enters the army, and the 30,000 conscripts who annually undergo military training return to their homes equipped to become health propagandists in civilian life. Vaccination against typhoid, para-typhoid, and small-pox is obligatory in the Argentine army, and in all military stations antityphoid vaccination is given free of charge to civilians requesting it. A careful health record of each recruit is kept from the day he enters. The laboratory work carried out by the Army Medical Service and the statistics kept by it have been of great value in completing a medico-geographical survey of the Republic, determining the malarial zone, and making a study of the climate, soil, and disease conditions.

The Colombian delegate gave an interesting account of the Health Centre founded in Bogota by the Red Cross in 1921 and now in charge of Dr. Adriamo Perdomo.

Panama.—Bolivia.—Paraguay.

In Panama the Red Cross is doing good work in child welfare and also for the tuberculous, for whom a clinic is maintained. According to the latest reports, over 60,000 children have been registered in the Red Cross child welfare centres since this work was started under the supervision of Señorita Morales. In April, 1925, a prenatal clinic was established under Dr Luis C. Prieto. At present there are 15 child welfare visiting nurses, in addition to one for the prenatal clinic, and another who goes daily to see poor families registered in the department for poor relief maintained by the Red Cross. Largely owing to the work being done under Señorita Morales's direction, the infant mortality rate in the town of Panama has fallen from 237 per 1000 in 1917 to 138 in 1925. The Panama Red Cross also does good service in visiting the Palo Seco Leper Asylum and helping the lepers in many ways.

Bolivia is another country which is much concerned with child welfare, for it suffers from a high infant mortality-rate, that for La Paz being 330 per 1000 in spite of its favourable climate. This high infant mortality has been ascribed to an insufficient and impure milk-supply. Although the Bolivian Red Cross was only officially recognised in 1923 it has already been active on behalf of children, and has worked in coöperation with the Infant Welfare Society of La Paz.

In Paraguay the Red Cross works in close coöperation with the doctors of the Public Health Service, who give their services voluntarily at its milk stations. The Red Cross also assists in carrying out school medical inspections and runs some public baths.

The resolutions passed by the Conference range over almost the whole public health field, and include recommendations

regarding child welfare, eugenics, prevention of blindness, the health of the school child, the teaching of health in the schools, popular health education, housing, industrial hygiene, nutrition, and public health nursing.

THE HEALTH OF A TREATY PORT.

WEIHAIWEI.

THE territory of Weihaiwei was leased to Great Britain by China by a Convention signed at Peking on July 1st, 1898, "in order to provide Great Britain with a suitable naval harbour in North China and for the better protection of British commerce in the neighbouring seas." The leased territory is situated in the Chinese Province of Shantung. It comprises the Island of Liukung, all the islands in the Bay of Weihaiwei, and a belt of land ten English miles wide along the entire coastline. Mr. W. Russell Brown, the officer administering the Government, has prepared a report on the affairs of the territory for the year 1925, which has been issued from the Colonial Office. Amongst other items it mentions that Surgeon-Commander A. McCloy, R.N., terminated his appointment in December as M.O.H. for Liu Kung Island, and was succeeded by Surgeon-Commander N. S. Meiklejohn, D.S.O., R.N.

The general health of the civilian foreign community, both resident and visiting, was good, and no epidemic occurred. One civilian death was recorded from carbuncle of the neck, and there was only one serious case of dysentery —a visitor who contracted the disease before arrival. The health of the native population was also satisfactory; only 156 cases of dysentery and diarrhœa were treated, of which 55 applied at the Island Hospital and 30 at Wen Chuan Tang. The total attendance at the three hospitals was 15,058, as compared with 14,898 in the previous year, whilst the in-patients treated numbered 259, as against 278. The operations performed were 938, of which 165 were under chloroform and 44 under cocaine, the remainder comprising tooth extractions (368), abscesses, and other minor surgery. Forty-two obstetrical cases were attended, mostly in the patients' own homes. Tuberculous disease of bones and joints is quite common, and a number of long cane deck chairs have been obtained from Hong-Kong to give these patients the benefits of sunlight and fresh air. The seven deaths in the Civil Hospital comprised three from injuries, one from poisoning (suicide), one from cholera, one from amputation of the leg, and one following operation for the removal of a stone in the bladder.

Owing to the prevalence of cholera in Shanghai that port was declared infected on August 17th, and all vessels arriving therefrom were boarded and the passengers and crew medically inspected, while a special hospital was fitted up for the reception of any cases that might be landed here. Sporadic cases of the disease occurred in neighbouring ports, but only one case reached Weihaiwei and was admitted to hospital, where the patient unfortunately died from uræmia five days later. Quarantine was removed on Oct. 5th. Seventy-three cases of poisoning were treated at the hospitals, arsenic and phosphorus (matches) being the usual poisons employed, the former in attempted murder cases and the latter in the much more frequent attempts at suicide. A case of considerable interest was that of a young man whose skeleton was found nine days after he had disappeared from home. The whole of the soft tissues had been stripped from the bones, and these were scattered over a clearing in high grass, all the small bones being missing, while the ends of the long bones showed evidence of having been gnawed. The skull had a long fracture on the left side, and torn fragments of clothing showed extensive blood-stains on the collar-bands and left shoulder and sleeve, while a blood-stained sack was also found on the spot. There was reason to believe that the man had been murdered and his body removed, with the sack over his head and chest, to the place where it was found outside the village, and had there been devoured by native dogs, but it was not found possible to secure a conviction, though three men were charged with the crime.

A vaccination campaign was held in May and June and 7074 persons were treated, but small-pox still occurs sporadically in the more scattered districts during the winter and early spring. Kala-azar, a disease first identified in 1900 and believed to be conveyed to man from the dog by fleas and bugs, is very prevalent in the district, no less than 100 new cases having presented themselves for treatment during the year. The aldehyde blood-serum test was found of value in confirming the diagnosis, and these cases have been treated with success by intravenous injections of antimony tartrate, commencing with a dose of ½ gr.; 438 of these inoculations were given during the year.

Situated on the sea-shore in the north temperate zone, Weihaiwei experiences neither extreme of great heat or cold. The climate is healthy and bracing in winter, and the summer, although hot, is by no means relaxing. The highest temperature yet recorded in the history of the territory is 99° F. in 1922 and the lowest 1° F. in 1913. The heaviest rainfall was 47·70 inches in 1914 and the lowest 15·53 inches in 1918. Rain fell last year on 54 days, the total fall being 23·66 inches, as compared with an average of 26·565 inches during the 20 years 1906–25.

SANOCRYSIN IN BELFAST.

EXPERIMENTS carried out with sanocrysin in Belfast during the year 1925 by Dr. Andrew Trimble, and summarised in his annual report just issued, have led him to the following conclusions: (1) Sanocrysin is a distinct therapeutic advance in the treatment of tuberculosis in definitely selected cases. (2) Observation for at least a year will be necessary in order to ascertain whether the good results obtained will be permanent. (3) Sanocrysin is not suitable for general use, and should be used only in institutions equipped with the necessary apparatus, and under the control of physicians of sufficient experience and expert knowledge in the treatment of tuberculosis. (4) Further research is necessary to determine the class of case most likely to benefit by this method of treatment, the correct dose for individual patients, the intervals between the doses, the length of the whole course of treatment, and the indication for the discontinuance of the treatment.

PLAGUE AND THE FLEA.

Surgeon C. L. Williams, of the U.S. Public Health Service, in the *Military Surgeon* for August, makes it clear that the flea responsible for transmitting plague from rat to rat and from rat to man is usually *Xenopsylla cheopis*. Some places in the track of plague epidemics escaped in a way unexplained until L. F. Hirst showed that at Colombo, which plague had then never attacked, the common flea was *X. astia*, and *X. cheopis* was absent. When plague did occur there later, in relation to a special importation of grain, it was in a restricted area of the town, and *cheopis* was now found in that district. Madras has also escaped plague; among hundreds of fleas from Madras examined by Hirst all were *astia*. Differentiation between *cheopis* and *astia* is difficult, depending on the form of the spermatheca examined under the microscope. Hirst's theory got little support until Major F. W. Cragg, I.M.S., examining rat fleas from all parts of India to find the habitat of the three main species, *X. cheopis*, *astia*, and *brasiliensis*, satisfied himself that the occurrence of plague in an area was closely correlated with the prevalence there of *X. cheopis*. In our own ports, judging by the experience of Cardiff (THE LANCET, 1925, i., 1051), *cheopis* is not found on rats outside the port area. It is probable that when it can be made, a map of *cheopis* distribution will outline the area of plague distribution, as a map of *Aëdes* distribution outlines the yellow fever areas. Surgeon Williams asks the question why plague reappears in an area it has once left, and answers it by assuming that at the close of an epidemic rats carry plague as a septicæmia without symptoms, as goats carry Malta fever. During 17 months after a recent Galveston epidemic, the last nine rats found infected showed no naked-eye sign of the disease, and the bacilli isolated had but little virulence. Men, too, may carry plague bacilli of low virulence in chronically enlarged glands. At a favourable opportunity these less virulent bacilli may light up a new epidemic.

HYGIENE FOR SCHOOLS.

A SMALL text-book[1] on hygiene, which is designed as a health reader for schools, has reached us. It is easy to read and understand and covers most of the ground fairly. On the anatomical side the skeleton, muscles, blood, heart, &c., are described; chapters on food, digestion, excretion, and the sense organs deal with physiology. Chapters on ventilation, clothing, and infection represent the field of hygiene proper. The book is open to criticism. The treatment of indigestion, for example, need find no place in a volume of this nature: advice as to the use of bicarbonate of soda for "heartburn," is surely quite out of place. An outline of infant feeding is rightly included, but there is no mention of the practical application of the study of vitamins, discussed at length some pages previously, to artificial feeding. The use of dried milk is not mentioned, although condensed milk is condemned. On certain controversial matters, such as infantile vaccination and the "tendency" to tuberculosis, Miss Shuttleworth is too dogmatic in her statements. The most serious fault of the book, however, is in the absence of any reference to the reproductive system. It is essential if a sane outlook on sex matters is to be established, that this system should receive the same attention in elementary text-books as any other system. The subject requires delicate handling, but that is scarcely an adequate reason for omitting it in a book written by one who, as biology mistress at a girl's secondary school, would seem specially qualified to deal with it.

[1] The Wonders of the Human Body. A Health Reader for Schools. By Margaret A. Shuttleworth, Biology Mistress, Sydenham County Secondary School. London: University of London Press, Ltd. 1926. Pp. 195. 2s. 6d.